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Editorials

THE DYING KING

"Were we to be directed from Washington when to sow and when to reap, we should soon want bread."

"Our country is too large to have all of its affairs directed by a single government."

—Jefferson.

BEFORE WE TURN OUR OWN BABIES AND OTHER SAFEGUARDS OVER TO UNCLE SAM, LET US TAKE A SURVEY AND ASCERTAIN HOW EFFICIENTLY HE PROTECTS HIS OWN OFFSPRING

Samuel B. Pettengill, a Democrat, member of Congress from Indiana, in his book "Jefferson The Forgotten Man," chapter 8, pages 48 to 55, says:

"Before proceeding further to obliterate the states, counties, cities, and towns; before wiping out the last trace of local responsibility of cities and citizens and turning over to the great white Father at Washington the welfare of 130,000,000 people, let us see how Washington, D. C., is run. Let us take a look at the demi-gods of Federalism behind the scene."

After describing the geographical dimensions of the capital city, the physical beauty and other attributes, we quote further.

Having said this, let us take a closer look at Washington, the capital of the nation, the baby of Uncle Sam. Let us go through the experiment station of federal government. Let us see how Uncle Sam has raised his own babies. It will be worth our while to do so before we turn our own babies over to his tender care; before we abandon state rights to his protection.

Every community is first of all interested in its own health. That is one of the things that Chambers of Commerce brag about with respect to their own localities. How about Washington and the health of the people who live in our federal city? For the year 1936, per 100,000 population, the vital statistics of Washington and

the Nation show that the death rate in the District of Columbia was 26% higher from cancer than the same death rate in the whole United States; 27% higher from heart disease; 49% higher and going up from pneumonia; 92% higher from tuberculosis; 106% higher from alcoholism; 119% higher from syphilis. So, on this vital question of health, put down the home of the Federal government on the one side and on the other side the average of health conditions throughout the rest of the nation. Then ask yourself whether the Federal government is doing such a good job in comparison with what is being done back in your home town, as to lead you to want it to take complete responsibility for the health of your own children.

For every 1,000 live births in the District of Columbia, the infant mortality rate is 26% higher than that of the whole United States, and the maternal death rate is 91% higher. Perhaps I should again remind you that I am giving figures about Washington, D. C., not one of the abandoned coal towns of West Virginia or a mill town in the South. These are the figures of the model city of a benevolent paternalism.

I should further remind you that it is the home of the Bureau of Public Health Service of the mightiest nation in the world. It is where the health officers of the Federal government themselves live.

And what about crime? That is a subject that interests people in the town where they might settle and raise their children. Washington is not without police officers. It is not that trustful of humanity. In fact, Washington has five separate police forces, the Metropolitan or City Police, the Capitol Police, the White House Police, the Park Police, and the Zoo Police. It is also the home of the G-men, "masters of crime." It is where they live and breathe and have their being. It is the city of the Department of Justice of the Federal government. It is the one city and the one district in which the Federal government has sole and exclusive authority and jurisdiction on all matters of law and order.

How does Washington compare in this important matter of crime with other cities in the United States? The comparison has been made by the chief law officer of the Federal government, Honorable Homer S. Cummings, Attorney General of the United States. That is what Mr. Cummings said last January at a meeting of the Washington Crime Forum:

"The crime situation in the District of Columbia amounts to a *national disgrace.* Washington should be a model city.

"Authentic statistics, covering the period from July to September, 1937, inclusive, indicate that out of *ninety-three cities with a population of more than 100,000,* Washington ranks in the *10 per cent of cities* with the *most crime* and that Washington is the *tenth* from the top of a list in the number of *murders and non-negligent manslaughters.* In the number of aggravated assaults it is *eighth* from the top of the list. In the number of automobile thefts under $50, it is *seventh.* In the number of *thefts* under $50, it is *sixth.* In the number of thefts more than $50, it is *third.* In the number of *robberies* it is *seventh.* In the number of *burglaries* and *housebreakings* it is *fifth.*

"Our resourcefulness as a city and as a nation is at a low level if we can't control major crimes and racketeering in an area of seventy square miles. The District of Columbia should be a model for the country—clean and free from lawlessness. Instead it *stands forth conspicuously as a crime center.*"

This is not in Chicago, Ill., or St. Louis, Mo., or New Orleans, La. This is Washington, D. C. It is an example of how the Federal government does things. It is what we find on the other side of the magnificent public buildings.

The next thing which the average citizen and his wife are interested in is housing. Let us look beyond these "magnificent distances" in Washington and see what exists in the nation's capital. The real property inventory of 1934, taken under the auspices of the United States, shows that in its capital city, there were more than 14,000 dwelling units without inside toilets; more than 4,000 without inside running water; more than 11,000 using kerosene lamps, more than 6,000 needing major repairs; more than 2,000 dwelling units unfit for use. Only two of the 64 American cities surveyed in this real property inventory had more houses unfit for use, or in need of major repairs but in use.

This is not some city whose people dwell in regimented shacks built by soulless corporations. We are not writing of conditions in Harlan County, Ky., where the Federal government charges that the coal barons condemn their wage

slaves to wretchedness. This, I must again remind you, as it is necessary for me to constantly remind myself is Uncle Sam's home. There is no large industry in Washington, no factories, no coal mines, no denuded hillsides. This is Washington. It is the place where the Federal Housing Administration lives and where the Home Owners Loan Corporation has offices air-cooled by the taxpayers living back home.

Washington, D. C., is also a city as little affected by the peaks and valleys of the economic cycle as any city in America. No factories close their doors on willing workers in Washington. The tentacles of the robber barons of Wall Street do not here condemn the citizens of Washington to the conditions I have detailed. It is a city of steady employment, of men and women paid from the longest purse in the world. As recently computed, it is the home of 111,130 Federal employees, and constantly growing in number, who never knew there was a depression in America in the years following 1929 until in March, 1933, when they were asked to take a 15% pay cut. The plight of thousands in private industry taking a 50% or 100% pay cut and being without jobs for months and years on end, is not responsible for conditions at Washington, the model city of a benevolent paternalism.

One third of the nation is ill-housed. We don't have to go down South to find them. It is not necessary to look that far. One need only lean out of a window in the Senate office building and see, and hear, and smell Schott's Alley, notorious for crime and disease.

Well, how about education? There is something that interests the fathers and mothers of America,—education in the nation's capital. In October, 1937, there were four school buildings housing 1,537 pupils, which buildings had been recommended for early abandonment in 1908—*29 years ago, but were still in use.*

In other school buildings classes were being held in basement rooms, play rooms, and corridors. A shift system was in effect in some schools in the nation's capital wherein two sets of children in the lower grades used the same room for shortened class periods. Although the normal class size is 35 to 40 pupils, there were 46 classes in excess of 50 pupils, and some classes ran up to as many as 84 children. There were 2,478 grade school children in classes in excess of the normal 40 to a class. There were 3,789 Junior and Senior High School students in excess of capacity.

We have heard much recently about the Federal government taking over the education of the children of the nation on the ground that the states and the cities are doing such a lamentable job. The uplifters and the bureaucrats constantly think up new reasons for extending their activities and increasing their payrolls. But in Washington, D. C., in the year of our Lord, 1937, of the many versions of the little red school house, there were 14 one-room grade schools, set up in play ground space, and heated by a coal stove in the rear of the room.

I should add at this point that Washington, D. C., is the home of the Office of Education, housed in the magnificent building of the Department of the Interior, which is constantly engaged in advising the rest of the nation how to educate its children.

At this point it may be of some interest to quote from the Report of the Advisory Committee on Education, appointed by President Roosevelt, in its report of February, 1938; they say—

"The Committee has detailed the situation of the District of Columbia at some length, because it believes that in no instance of Federal relationships to local conduct of education has the Federal government departed so far from the spirit of American institutions. The Committee thinks that in recommending Federal aid for education throughout the United States it would indeed be delinquent if it did not recommend first of all that the Federal government set its own house in order."

My only purpose in presenting the seamy side of Washington is to disillusion the millions of our people who believe that the Federal government is better than state and local governments; that the badge worn by the bureaucrat of Washington makes him wiser, less selfish, more far-visioned than the public officials whom you elect back home to run the affairs of your own community.

This record of Washington is a Stop, Look and Listen sign to everyone who is tempted to abandon state rights, home rule, and local responsibility for the doubtful blessings of Federalism.

When you are requested by Federal officials, whose salaries are paid by taxes taken from your

own pocket, to hand over your destinies to them, it would be well to reflect upon the parable of the man in olden times who was advised to remove the beam in his own eye before he undertook to remove the mote from the eye of his neighbor.

WHY PREMATURE OLD AGE?

Unless we welcome death as a remedy to terminate worries or suffering, the vast majority of us begin to look around seeking ways and means to live longer after we reach the age of 50 or 60. Obviously, our moments of pleasure and happiness have exceeded those of sorrow and misery allotted to us by Providence. Just as mariners shun rocks and shallow waters, many old men and women bend their steps away from the chilling river where Charon waits as they might draw away from a pestilential city. Realizing that they "once departed may return no more," aging men search for a way to carry on a little longer, as ancient alchemists did when they tried to find ingredients for an Elixir of Life, and when Ponce de Leon sought the Fountain of Youth. They derive no pleasure from reading the poet's allusion to death when he says, "Ourselves must we beneath the couch of earth descend; ourselves to make a couch for whom?" As they grow older they find new dreams and fancies in life, or their affection for friends and beloved relatives increases. Perhaps on many previous occasions they would have welcomed death, but now they wish to prolong their days—their earthly sojourn.

What is old age, and what do we mean by senescence, senility and senectitude? When Cicero undertakes to point out that although bodily strength of illustrious and venerable Romans was feeble, they carried on concerns of life by the mind, he alludes to the Latin senex when he says, "Now, unless those faculties existed in old men, our ancestors would never have called the supreme council by the name of senate." Semnos was the Greek word for revered, honored, grave, majestic, and senex found its origin in semnos. During the first century an aged person or a person advanced in years was counted from the latter half of the fortieth year onward. George said that senex is a person over 60 years of age, although senex was also sometimes used hyperbolically of persons from 45 to 60. Plautus (B. C. 184) says: "qua senex tabescit dies," i. e., far advanced, drawing to a close. When Hannibal discussed terms of peace with Scipio and said, "for I am returning to that country an old man which I left a boy," he was then not yet 50 years of age. In Josephus we see this: "Now I have for witnesses to what I have said, all those that have written Antiquities, both among the Greeks and barbarians; for even Manetho who wrote the Egyptian History, and Berosus who collected the Chaldean Monuments . . . and those who composed the Phoenician History, agree to what I here say . . . that the ancients lived a thousand years." He also says that Noah lived 950 years, and Moses died at the age of 120. During the time of Josephus it is probable that men did not live as long, for he writes, ". . . and with the few years which we now live."

Pliny tells about the ages of several men who lived in ancient times, and he mentions Xenophon who "gives to a king of the island of Lutmii 600 years, and then as though in that instance he had lied too sparingly, to his son 800." Continuing he says that all the statements relating to great ages of men "have originated in a want of acquaintance with the accurate measurement of time. For some nations reckon the summer as one year, and the winter as another; others again, consider each of the four seasons a year. . . . Others, such as the Egyptians, calculate by the moon, and hence it is that some individuals among them are said to have lived as many as a thousand years." He hastens to proceed, however, and tell us ". . . what is admitted to be true. It is pretty certain," he writes, "that Arganthonius of Gades reigned 80 years . . . Gorgias, the Sicilian, lived 108 . . . Perperna lived 98 years . . . Terentia, the wife of Cicero, lived 103 years, and Clodia 115 . . . we are informed by Mutianus that on the peak of Mount Tmolus . . . the people live 150 years, and T. Fullonius, of Bononia, was set down as of the same age in the registration which took place under the censorship of Claudius Caesar." From this account of Pliny it appears that people lived about as long during the first century in the Roman Empire, with the exception of those on Mount Tmolus, as they do today throughout most of the world.

Even after a careful review of ancient literature it is difficult to determine whether men

might have lived to great ages if they had been spared the rigors of war and the fate of soldiers. When we are reminded that the bodies of myriads of men and women have enriched the soil of all lands since the beginning of time, it is reasonable to believe that many might have lived several hundred years had not nearly all devoted their lives to warfare. Biblical references to age are somewhat contradictory, too, and they fail to explain certain disputed questions. In the tenth verse of the 89th Psalm Moses said, "Our years shall be considered as a spider: the days of our years in them are threescore and ten years." And Genesis has this: "And God said: My spirit shall not remain in man forever, because he is flesh, and his days shall be a hundred and twenty years." Many accept threescore years and ten as the normal duration of life today, and yet when these lines were first written nations destroyed other nations with as much savagery and ferociousness as they have done during all subsequent ages. Perhaps countless numbers of them might have lived several hundred years had they not been killed in war. It is clear that literature does not reveal any satisfactory definition of senescence that all are willing to accept. Again, it appears reasonably clear that millions of persons in nearly every age have believed that men should live longer if they attained great ages in the beginning. Nor is this all, for it seems natural for men to wonder why animals, such as the horse and cow, live as long today as they did in the beginning. If this is true then it can be said at once that the shortness of human life and the most of human ills can be attributed to the faculty of reason.

Heredity, nutrition and environment are, perhaps, the chief causative factors in premature old age. The majority of old persons had long-lived parents, grandparents, brothers and sisters. But there is a long list of other factors such as the rush and hurry of present-day civilization, the strain and stress of business worries, overeating, intemperance and uncontrolled emotions. Almost all very old persons have lived quiet lives under peaceful conditions, and it appears that many who become old prematurely have never been able to adjust themselves to so-called civilization. With respect to marriage numerous investigators are convinced that unmarried persons seldom enjoy longevity. One old theory about senility is that when magnesium begins to disappear from the human organism old age begins. It is the opinion of some scientific writers that the lack of magnesium may be due to the decreased ingestion of food containing it, or cells cannot store it in sufficient quantities as they did during the years of youth. Numerous workers have shown that when certain animals such as rats have been kept on a restricted diet they lived longer than those that were allowed to eat as much as they desired. Hair of well-fed rats finally became dry and coarse, whereas those that were fed but little had fine hair with a luster. Some contend that old age is not a disease, but a normal physiological period of life. Others say that there is no such thing as a natural death, and that careful investigation would reveal that the aging process or the wearing out of an individual is, to a greater or less extent, due to the effects of some intercurrent disease.

There are some who hold the endocrine glands responsible for premature old age or senescence, and it is believed that in numerous instances those who lead libidinous lives shorten their days. Immorality is another etiological factor added to the long list. A careful study of the works of scientific writers will reveal that the two foregoing statements are debatable, however. At the present time and perhaps in all ages there are and there have been many lascivious or immoral men who have not died prematurely. Perhaps Osler had this in mind when he said, "The world's history again shows that a very large proportion of evils can be traced to the sexagenarians—nearly all the mistakes politically and socially, all of the worst poems, most of the bad pictures, a majority of the bad novels, and not a few of the bad sermons and speeches, can be traced to sexagenarians." It is obvious to anyone who knows how Osler delighted in this type of dry humor that this must have been written while his fingers were crossed. One cannot be as liberal in judging the meaning of another writer who occupies a seat high in the halls of the literati, however. Shaw has been credited with saying that "all men are rascals after 40." This despite the fact that he rounded out 82 years a short time ago, and said "he wished people would forget his birthday."

Perhaps the length of life of a man is fixed at his birth; it depends upon the constitution he

is born with—the energy or vitality he has inherited from his parents and other generations before them. Involution begins when there is an embalance—when demands upon this reserve or store exceed natural processes of repair. Regression or involution is manifested by a wasting away of tissues, or they are altered and different from the tissues of youth. Premature old age or senescence is marked by atrophy of nerve cells and muscles. There is less organic matter in bones, and the marrow is denser. Walls of blood vessels lose their elasticity and their tone. As a rule the skin is drier and less elastic, and there are frequently marked changes in the endocrine glands, such as a diminution of secretions. If these changes can be discovered before they have made too much progress, some of them can be held in check or even prevented. Life expectancy has been increased during the past century, especially in infancy and childhood, but it is generally accepted that nothing can be done for anyone which will influence his length of life to any considerable extent. Moreover, in premature old age functional activity of organs is frequently impaired, and the heart appears to be affected the most. About half of all physicians in the United States over 45 years of age die of cardiovascular disease. Beginning at the age of from 45 to 50 the majority of men and women have a steady increase in systolic and diastolic pressure.

What are we going to do about it? Can we hinder, stop, or turn back old age? A large number of aged men and women who have led careful and methodical lives think that it can be done; that if others would follow similar self-imposed rules and regulations many more persons would live even beyond a hundred years. They think and say that if one wishes to live long he should direct his efforts toward that objective early in life, and never permit this fixed purpose to waver. On the contrary there are many male octogenarians and centenarians who contend that throughout the greater part of their lives they used tobacco, drank alcoholic beverages, and paid little attention to the choice of foods. All studies of longevity reveal that there are more old women than men; it seems that this fact should overbalance the evidence of old men who smoke and drink, for comparatively few aged women are addicted to those habits. It may be that nearly all aged persons will agree on one dictum pertaining to the attainment of old age, namely: that whether we live long or die prematurely, depends mainly upon the manner in which each individual chooses to live.

Doubtless there are many old persons who accept the changes wrought by premature old age gracefully, and as something inevitable. Perhaps their concept of a shorter life is based on the same philosophy as the Timaeus of Plato, namely: ". . . but the artificers of our race, after thoroughly considering whether they had better make it more lasting and of worse condition, or shorter but of a more excellent character, were agreed that a shorter but better life was wholly preferable to one longer, but inferior." Cato's advice will be advantageous to those who wish to lengthen their span of life—he who began learning the Greek language at 80. He says, "We must make a stand against old age, and its faults must be atoned by activity; we must fight, as it were, against disease and in like manner against old age. Regard must be paid to health; moderate exercise must be adopted." And a little later on he continues, "For as I like a young man in whom there is something of the old, so I like an old man in whom there is something of the young; and he who follows this maxim, in body will be an old man, but he will never be an old man in mind." Thoughts of Horace flowed in the same channel when he wrote to Virgil: "Lay aside delay and the desire of gain; and mindful of the gloomy (funeral) flames, intermix, while you may, your grave studies with a little light gaiety."

Thucydides thinks that while growing old we should be like the state: ". . . and that the state if it remains quiet will be worn out on itself, like anything else, and its skill in everything grow dull; while by entering into contest it will continually gain fresh experience, and will find self-defence habitual to it, not in word, but rather in deed." On this particular point his philosophy was the same as that of Solon who, in his verses, boasted that he was "becoming an old man daily learning something new"; he knew that decay of intellectual powers is inhibited, provided study and application be kept up. There is a time in the affairs of nearly all of us who are pleased with life when we learn this. One of the most laudable attributes of aged persons is that equanimity of mind some of them exhibit during

their last years. They scorn the fast approaching end as Cicero did who said that "old men die as the exhausted fire goes out, spontaneously, without the exertion of any force; a state which to me indeed is so delightful that the nearer I approach to death, I seem . . . to be getting sight of land, and at length after a long voyage, to be just coming into harbor."

PAPERS FOR 1939 ANNUAL MEETING

The 1939 Annual Meeting of the Illnois State Medical Society will be held in Rockford on May 2, 3 and 4, the date having been changed on account of the meeting of the American Medical Association to be held in St. Louis during the week of May 15-19.

Owing to the fact that the meeting of this Society will be held the first week in May, it is necessary to make the usual arrangements one month earlier than is usually the case. All committees are now being selected and are ready to go to work so that the Rockford meeting next year will be an exceptionally fine meeting.

All members of the Illinois State Medical Society who desire to present papers in any of the sections are requested to get in touch with the proper section officer as early as possible, tell the subject you desire to discuss, send a short synopsis of the subject matter, and contact the proper officer of the section you are interested in, and we are listing same in this article.

Owing to the fact that the papers to be presented before each section must be limited in number, the officers of the sections are anxious to schedule only those papers which will be of general interest to all members, and they must necessarily be critical in making the selections.

OFFICERS OF SCIENTIFIC SECTIONS

Section on Medicine—Robert Keeton, *Chairman,* 8 South Michigan Ave., Chicago; E. M. Stevenson, *Secretary,* Bloomington, Illinois.

Section on Surgery—Darwin Kirby, *Chairman,* Champaign, Illinois; Frederick Christopher, *Secretary,* 2650 Ridge Ave., Evanston.

Section on Eye, Ear, Nose and Throat—S. J. Meyer, *Chairman,* 58 East Washington St., Chicago; Frank W. Broderick, *Secretary,* Sterling, Illinois.

Section on Public Health and Hygiene—F. S. Needham, *Chairman,* 124 South Marion St., Oak Park; L. E. Orr, *Secretary,* Springfield, Illinois.

Section on Radiology—Harry Magee, *Chairman,* Peoria, Illinois; Warren W. Furey, *Secretary,* 7830 Euclid Ave., Chicago.

Section on Pediatrics — Gerald Cline, *Chairman,* Bloomington, Illinois; Orville Barbour, *Secretary,* Peoria, Illinois.

Section on Obstetrics and Gynecology—W. T. Carlisle, *Chairman,* 122 South Michigan Ave., Chicago; W. A. Malcolm, *Secretary,* Peoria, Illinois.

A member of the Illinois State Medical Society who would like to present a paper before any of these sections should write to either the chairman or the secretary of the section in which he is interested; one of the officers resides in Cook County and the other in the down-state counties, and it is desirable for Chicago members to write to the Chicago section officer, while the down-state members should write to the down-state official in order that the papers may be fairly well divided between the two groups.

Each year, long after the scientific programs are made up for each section, letters are received from members of the Illinois State Medical Society asking for information relative to the presentation of a paper at the next annual meeting. It is therefore desirable that all physicians who desire to present a paper before any of these scientific sections should write to the proper section officer at once, sending your name and address, the title of the subject you desire to discuss, and an outline or synopsis of the subject matter of your paper. This will better enable those who are responsible for the development of the programs to make the proper selection for a well balanced program.

The preliminary program for the 1939 Annual Meeting in Rockford must be published in the March Illinois Medical Journal, and the official program will appear next month, which means that the officers of sections who are responsible for the development of the various programs must get their speakers within a relatively short time.

HOUSE OF DELEGATES COMMITTEE MEETS WITH INTERDEPARTMENTAL COMMITTEE

On October 30, the Committee of the House of Delegates of the American Medical Association met with the Interdepartmental Committee to Coordinate Health Welfare activities of the Government in Washington.

"In a joint interview, following the conference, by Dr. Irvin Abell and Miss Josephine Roche, it was pointed out that the conference had reached no definite conclusion or specific plans for cooperation, nor had there been any abandonment of specific positions taken by either group in relationship to the program. The representatives of the government again explained the detailed concept of the National Health Program. The representatives of the American Medical Association indicated the actions taken by the House of Delegates, which involved approval of the extension of public health service specifically related to the prevention of disease and the provision of hospitals and allied institutions and of government assistance for the care of the indigent when the need can be established. The medical representatives pointed out that in hospitalization and the care of the indigent the administration should be simple and placed in the hands of responsible public officials who would cooperate with local medical societies. The medical representatives again expressed opposition to compulsory sickness insurance and the fear of the fact that the insistence on such a system by the government would be "bureaucratic, costly, and political."

In a brief report on the conference, President Irvin Abell said:

"The reception accorded our committee was quiet friendly and the discussion evinced the same spirit on both sides. They were fruitful in bringing out a better understanding of opposing points of view and in focusing attention on the discrepancies in data and statistics on which such points of view are founded. While tentative agreement in principle, not in methods of application, was reached on four of the recommendations, the conference was stymied by the question of compulsory sickness insurance. The Interdepartmental Committee is to hold conferences with representatives of other groups, notably the American Public Health Association, the American Dental Association, the American Hospital Association and the American Nursing Association. It was suggested that our committee return at a later date for further conference presumably after the above named organizations, through their representatives, have had opportunity to express their views. If this invitation is accepted an early date was suggested, as the Interdepartmental Committee will prepare its report to be submitted to the President at the opening of the Congress, when its recommendations may be embodied in proposed legislation."

A CORRECTION

The article "THE EDUCATIONAL COMMITTEE: ITS ORIGIN AND WORK," which appeared in the November issue of the ILLINOIS MEDICAL JOURNAL, contained the misstatement to the effect that about $1200.00 was collected by voluntary contribution to establish a sufficient working capital to show the possibility of an up-to-date progressive lay educational program. The amount mentioned, namely, $1200.00 was an error on the part of the printer, the statement should have read "that approximately $12000.00 was collected by voluntary subscription."

The ILLINOIS MEDICAL JOURNAL in regular monthly issues beginning February, 1923, and through May, 1924, contained a Roll of Honor, that is, the issues mentioned contained a printed list of names of Doctors who contributed to a voluntary fund that made the setup and the ground work of the Educational Committee possible previous to the committee's activities being taken over and financed by the Illinois State Medical Society.

Since 1927, the Educational Committee has had as its secretary the genial and efficient Jean McArthur. Miss McArthur's supervision and direction of the activities of the committee has been a credit to herself as well as to the Illinois State Medical Society.

PUMP BLOOD THROUGH CORPSES

Pumping blood through dead bodies sounds pretty gruesome, but two St. Louis scientists, Drs. John Russell Smith and William Bryan Kountz of Washington University School of Medicine, have found it a valuable means of learning more about causes of high blood pressure and the way diseases affect various organs of the body.

High blood pressure probably has more than one cause, they learned from the cadaver studies. In these studies, specially prepared animal blood was run into the bodies by an artificial heart connected to the large artery in the chest.

Decrease in blood supply to the kidneys such as occurs in nephritis is sometimes responsible for high blood pressure, they found. Disturbance of salt balance of the blood tends to make the blood vessels more sensitive to the hormones which are normally present in the blood, and this also may be responsible for elevated blood pressures.—*Science News-Letter.*

MEDICAL ECONOMICS

H. M. Camp, M. D.
E. P. Coleman, M. D.
W. M. Hartman, M. D.
J. R. Neal, M. D.
I. H. Neece, M. D.

Edited by the Committee on Medical Economics
of the
Illinois State Medical Society
E. S. Hamilton, M. D., Chairman
Kankakee, Illinois

R. K. Packard, M. D.
Ralph Peairs, M. D.
C. B. Ripley, M. D.
C. S. Skaggs, M. D.
C. E. Wilkinson, M. D.

Address all letters and communications to the Chairman.

The realignment of forces in the next Congress should not delude the medical profession into a sense of false security as to any less danger of changes in the manner of conducting the practice of medicine receiving consideration. Those of you who have read the organization section of the *Journal of the American Medical Association* the past month know that the Grand Jury investigation of the American Medical Association in the District of Columbia courts continues with the calling of some of the official family of the A. M. A. The outcome is, of course, problematical, but the inevitable conclusion is that the medical profession is in for a rough time.

At the last meeting of the Council of the Illinois State Medical Society, it was evident that the activities of the Public Health Service in Illinois were ready for a definite increase. A new activity, the Illinois State Pneumonia Control Program, was presented with a chairman. Dr. Lindberg announced that they were beginning work and that they were examining laboratories as to their facilities and ability to type the pneumococcus and would present to the Council and the profession of the State a complete program of activity in the near future. This will probably include typing of sputum and the furnishing of free serum to those suffering from pneumonia. In addition the activities of the Committee on Maternal Welfare were increased and the chairman of the Committee, Dr. Frederick Falls of the University of Illinois, presented for consideration a plan for improvement of the obstetrical department of the hospitals of Illinois. Definite action on this was delayed for a month until all the members of the Council had sufficient time to study the subject and talk over its application with the local hospital authorities.

Recently, Dr. Nathan B. VanEtten, former Speaker of the House of Delegates of the American Medical Association, delivered an address at a meeting of the Kings County Medical Society in Brooklyn. This speech was published under the title, "The Doctor at the Crossroads," in the November 1 issue of *"Vital Speeches of the Day."* This is one of the best articles on the current problems of the medical profession to come to the attention of the writer of this article and he suggests that every man who has the opportunity read this article with great care and then pass it on to some other member of the profession. Reprints are available through the Medical Relations Bureau of the Medical Society of the State of New York, New York City.

Another article giving the viewpoint of the medical profession is one by William Allen Pusey, former President of the Americin Medical Association, which appeared in the November issue of *America's Future,* a new periodical devoted to maintaining the present philosophy of Government. Probably every member of the medical profession received an introductory copy of this magazine and it is to be hoped that he took time to read the same and then placed it on the table in his waiting room, where it will be available to the public. We need to present this type of article to the public, and coming from the lay press, it is received much more favorably than when it is in a medical journal.

Prior to the recent election, practically every issue of the *United States News* coming out of Washington insisted that a real effort would be made to pass some type of Socialized Medicine at the coming Congress. It even went so far as to outline the main points of the proposed bill and commented that it seemed probable that it would pass either in its entirety or in part. To the writer, this paper has seemed very fair in the past in its attitude on this subject, and it has been quoted in this column many times in the past year. However, it seems that it is quite radical in its ideas the past month and many members of the profession in Illinois have called attention to the apparent inaccuracies of some

of their statements. We must be impartial and admit that at times we have disagreed with their statements, but in most instances they were merely giving opinions and certainly they are entitled to their own opinion and in addition they should be in position to know the atmosphere of official Washington much better than those of us in the prairie state of Illinois. We shall continue to read their articles on Medicine although we at times shall disagree with them. We hope that many of the profession of Illinois will continued to do the same.

We hope that many members of the profession have taken the time to write the Senator-Elect from Illinois, Scott Lucas of Havana, to congratulate him both on his election and his definite stand on the subject of State Medicine. Prior to election he admitted that he was surprised at the interest of the medical profession in the question and would help them. We should continue our interest and contact him at every opportunity. We should do the same thing with the members of Congress from our District. Also the two Congress-men-at-Large, John Martin of Salem, Illinois, and T. V. Smith of Chicago. Regardless of our personal political affiliations, these men are our representatives in Congress and they should and will follow the desires of the people of Illinois provided the people of Illinois let them know what they, the people, want. In medical matters, the medical profession should guide their activities.

Fortune, that aristocrat of periodicals, recently had an article on the American Medical Association which while not exactly favorable to the medical profession, should be read by that portion of the profession who can afford to subscribe to such a magazine, or who have the same available at a club. It is a good article, even though the conclusions arrived at may be at variance with that of the majority of the readers in the medical profession. Anyone interested in the economic problems of medicine will continue to find interesting reading in many of the current lay periodicals. Some may irritate a little but it is well to read up on both sides of controversial questions, particularly those affecting the medical profession so intimately.

E. S. Hamilton,

Chairman Committee on Medical Economics.

SOCIALIZED MEDICINE AND THE FEDERAL FARM HEALTH PROGRAM

Vigorous protests of the American Medical Association against socialized medicine have not affected the federal government's responsibility in caring for the health of the nation's farmers.

Low-income farm families of twelve states are *now participating* in medical aid programs promoted by the Farm Security Administration. Plans are being made to extend this program to several other states.

The government justifies its action by claiming that rehabilitation of low-income farm families and making them self-supporting is impossible unless adequate and proper medical attention is given them.

According to Dr. W. W. Alexander, Administrator, "Quite aside from any humanitarian purposes, the Farm Security Administration has found, as a lending agency, that a family in good health is a better credit risk than a family in bad health. It has developed plans for medical care because it has found that good health is a necessary part of a family's rehabilitation."

PROGRAM STARTED NOV. 1, IN DAKOTAS

On November 1, the Administration expected to begin operations in North and South Dakota. Approximately 77,000 families of those two states will be eligible to participate in the program. The cost will be $2 per month per family, and the F.S.A. is prepared to loan $16 to each family signing up. This amount will provide care for the remainder of the fiscal year. The plan is open only to those families who are now being, or have been, aided by the Farm Security Administration.

THE PRINCIPLE OF INSURANCE

At the special session of the house of delegates of the American Medical Association, held in Chicago, September, 1938, the organization section made the following recommendation which was approved.

The American Medical Association has never opposed the principle of insurance. An organization such as ours is in itself of the nature of a cooperative group in which individuals have banded together and by their individual contributions have made possible great accomplishments which individually they could not have

attained. It is not the principle of insurance that is opposed by American medicine. The principle which we do oppose is political administration and manipulation of the insurance organization, devotion of a considerable portion of the funds thus derived to the payment of great numbers of employees not directly concerned with the service but intimately concerned with the maintenance of a political organization, and expansion of such organizations to wield greater and greater power in the affairs of the nation.

The American Medical Association has not opposed insurance against the costs of sickness, of disability, of unemployment, of old age or of death. It does oppose any interference by any outside agency — commercial, governmental or otherwise—into the relationship between doctor and patient which is fundamental in good medical care.

Basically, the doctors of America primarily interested only in providing or co-operating with a system of sickness service free from political manipulation.

The problem of the low wage group is not medical, but is one hundred per cent. economic. We do not deny that the man with an income of less than one thousand dollars per year cannot pay for superior medical care. Neither can he buy as many diamonds or as many suits of clothes as his more prosperous neighbor, neither can he ride in a Rolls Royce or enjoy annual trips abroad.

Neither does the low wage earner expect to have all the super luxuries. But he *is entitled* to a decent wage which would enable him to buy *better clothes, better housing* and abundance of food and financial ability to support and educate his children.

SOME RECOMMENDATIONS FOR A BENEVOLENCE FUND

1. That the Woman's Auxiliary to the Illinois State Medical Society do forthwith establish a Benevolence Fund to aid the needy Doctor and his wife, and set aside an initial sum of ..... dollars for that purpose.

2. That plans be formulated and steps be taken to raise a sum of money annually to be added to this fund.

3. That whenever possible, contributions to this fund by individuals be encouraged.

4. That application for assistance from this Benevolence Fund can be made through the local Medical Society or its Auxiliary, who will forward the same to the Benevolence Committee.

5. That this fund be administered by the Woman's Auxiliary to the Illinois State Medical Society, through a standing committee consisting of three members, elected by the Auxiliary Board, from the membership of the State Auxiliary. One member shall serve for one year, one for two years, and one for three years; and thereafter one member to be elected each year for a term of three years.

6. That is shall be the duty of this committee to receive and act upon each application for aid, in the order received, and to render such aid as the circumstances warrant.

7. That the Illinois State Medical Society be notified of the existence of this Benevolence Fund, and that an announcement to this effect be made at a meeting of every County Medical Society and its Auxiliary.

Correspondence

Springfield, November 23, 1938.

FREE SULFANILAMIDE

The State Department of Public Health has announced that sulfanilamide is available free on requests of physicians for the treatment of patients suffering from gonorrhea. The only requirement is that the request be accompanied by a report of the cases for which the drug is desired. Cases may be reported by either name or code number. Any physician in Illinois may obtain sulfanilamide sufficient to treat any and all gonorrhea patients under his care who in the physician's judgment will be benefited thereby. The drug is distributed in vials of 100 tablets of 5 grains each.

It is recognized that to be effective, sulfanilamide must be used therapeutically at the proper time, in appropriate dosage and in properly selected cases. It appears, for example, that sulfanilamide is not of value and may even be injurious when used during the early stages of infection, interfering with natural reaction to the infection. Apparently this drug is valuable only as an adjunct to reaction when that has reached a certain stage of development. Sulfanilamide has no value as a prophylactic, a fact that cannot be too strongly emphasized.

When properly timed and used, sulfanilamide seems to be of sufficieent value in the treatment of gonorrhea to justify its distribution as a public health measure. The Department has, therefore, stocked a supply and will be glad to provide the drug in the quantity needed to physicians of the State who so desire and who report the cases to be treated with the sulfanilamide requested.

A. C. Baxter, M. D.,
Acting State Health Director.

RECOVERY

Association of Former Patients

Illinois Psychiatric Institute

Chicago, Illinois

Chicago, Ill., October 31, 1938.

To the Editor:

May I ask you to enter the following notice in the Illinois Medical Journal:

"The Association of Former Patients of the Psychiatric Institute of the University of Illinois called a public meeting Thursday, October 27, to which representatives of the leading civic organizations were invited. The meeting took place at the University of Illinois College of Medicine and was addressed by representatives of the University and of the State Department of Public Welfare, and of various civic organizations including the Illinois Society for Mental Hygiene. In addition one male and one female patient who had recovered from shock treatment, and the father of a patient made speeches. More than 500 patients, relative, and friends attended. The object of the meeting was to solicit public support for legislative changes in commitment procedures.

"The Association of Former Patients was formed in November, 1937, and comprises over 100 patients discharged after receiving shock treatment. In addition it has over 200 Associate Members composed of the relatives of the patients. Its objective is to fight the stigma attached to mental disease. With this aim in view it contemplates legislative action to rid the mental patient and his family of the disgrace of the court record."

A. A. Low, M.D.,
Assistant Director, Psychiatric Institute President, Association of Former Patients.

SINULITH IN MAXILLARY SINUS

DeKalb, Illinois, Nov. 10, 1938.

To the Editor:

History:

Patient—E. W., Married Woman, age 62.

About fifteen years ago had growth removed from both nostrils by a physician in another city. Soon after the operation she developed a fetid discharge from left nostril with pains in top of head and dizzy spells. Had teeth removed three years ago for pyorrhoea. Blood pressure 175/100. Other physical findings normal except for nasal condition.

Findings:

There is foul smelling pus in middle meatus of left nostril and trans-illumination shows shadow over left maxillary sinus. October 7th, 1938 the intra-nasal window operation was performed on sinus and the stones were found, which are being passed around.

I have had many cases of rhinoliths, but this is the first case of a stone in the sinus I have ever had or heard of.

A guess at the etiology would be that asmall fragment of bone was dropped into the sinus at the time of the operation fifteen years ago and that the limestone salts had been deposited on this. The condition had existed thriteen years before the teeth were removed. The pains in her head and dizziness have subsided.

Clifford E. Smith, M. D.,
De Kalb, Illinois.

Presented at Staff Meeting, Glidden Memorial Hospital, De Kalb, Ill., November 1, 1938.

POLITICAL ANTITOXIN

Oak Park, Illinois, Oct. 4, 1938.

To the Editor:

A new illegitimate baby was born to the Department of Justice in Washington and christened with a modern name, "Socialized Medicine." To justify such an act it was interpreted to have a function," to lower the cost and improve medical care to the neglected third of our nation, and so for the past four months the topics of medical care and its cost have held the center of attraction in all the newspapers and magazines as well as the misinformed public in general. The representative to the Department of Justice in Washington did not deem it necessary to consult with the medical profession or its representatives

who are vitally interested and best informed as to the actual facts in medical economics and, if necessary, to devise means and ways for the proper care and lower cost, but the Department proceeded with attacks and threats against the medical profession and their representatives of an alleged illegal activity against cooperative groups attempting to reduce the cost of medical care irrespective as to its qualifications.

Are we living in an age of "Conviction without trial," or are we following the principles of dictatorship across the sea? From time immemorial the medical profession attempted to live up to its principles irrespective of compensation in treating the "poor" and the "rich" alike. Many books have been written by physicians, as well as laymen to substantiate these facts and it needs no other proof unless for the sake of argument. Why not attack the economic question which is the greatest factor for most of the poor being sick. It is a known fact that sickness prevails amongst the poor to a greater degree than amongst the well-to-do for which statistics are not necessary, if so, why not attack those that have a lot to offer without giving instead of attacking those who have always contributed to the welfare of our nation. Why evade the cause and its issues and mislead the American public? The facts in the case are that about a year ago 430 doctors signed a petition for socialized medicine. They are men of high standing in the medical profession and their communities, and the greatest number of them are attached to clinics and medical schools and are not in active practice. These medical schools have enjoyed glory and reputation for many years in the past but have lost to a great extent the financial assistance in the years of the depression and, as a result, their teaching staffs have been reduced to a minimum with lower salaries to those that have been retained, with the possibilities of greater difficulties in the future, and in order to survive it became necessary for time to find a solution for immediate help. Knowing that the federal government has become the Santa Claus to the forgotten people, they convinced some "politicians" that one-third of the population is not receiving adequate medical care and from a humane standpoint it should be the duty of our government to step in and take charge of this deplorable situation and thereby set itself up as an agency with schools and clinics to further better medical care at a lower cost in order to survive. The politician discovered in this newborn, a ray of hope to popularize themselves with the general public and took advantage of this opportunity as it presented itself, and proceeded to attack the medical profession to gain their political objective. As a result of these attacks the medical profession who are honest and sincere, proceeded to gather data and information on the care and cost of medical aid to our entire population. And 100,000 sincere physicians and poor *POLITICIANS* are side-tracked as to the real issues in this controversy and thereby are permitting our politicians to go ahead with their plans undisturbed, and if, and when, the time will arrive when the medical profession will have all their facts tabulated to prove that the people of this country are receiving the best medical care on this universe, the politician will have gained his objective and the doctor will be the forgotten man.

For the past twenty-five years I have been politically inclined, as a hobby only, and have gained considerable experience as to the etiology and treatment of political ills, and it is for this reason, that I offer what I think is a solution, or as I call it, a political antitoxin to stop such political nuisance.

Robert Louis Stevenson said, "The physician is the flower of our civilization." Evidence indicates that the physician is still maintaining his traditional place as a community leader and, as such, he serves his community, state and nation. He is interested in their welfare and uses his influence which is, perhaps, greater than realized upon the right side of the question. Therefore, I propose that if physicians take it upon themselves as leaders and proceed to explain to each and every patient that he contacts or treats the detriment and abuses that are connected with state or socialized medicine and, with that, presents him a petition for his signature directed to our federal government stating that they are opposed to that type of practice, and all these signed petitions to be forwarded to the representatives of the American Medical Association, and they in turn will deliver them in person to our federal government in Washington which will express the sentiment of our American people. This is a whip which the politicians fear the most. For, an opinion of ten million citizens which could easily be obtained by the medi-

cal profession within a few months with a little concentrated effort would solve the entire political nuisance of state medicine, not only for the present but for many years to come. The politicians fear public opinion for it is the only factor that keeps them In or Out of office.

At a recent lecture by Mrs. Franklin Delano Roosevelt, the wife of our President, who is well informed, stated, "The government acts according to public sentiment." Individuals may create such sentiment by expressing their viewpoints and opinions to their friends and their neighbors and within a period of time that sentiment becomes national and will stop any legislation which may be detrimental to its citizens. To substantiate the truth of this statement I had an opportunity of acting as secretary of a local group of physicians in the town in which I reside consisting of twenty-five members. During that period when the Sheppard-Towner bill came up in Congress for its passage, we, as a medical group, wired our congressman, at that time, John J. Gorman, to vote against that bill and within a few days he replied that he would use his own judgment when the bill presented itself. This small medical group went on record to oppose him in the fall election which was but a short time away and fortunately was lost by a small margin of approximately fifty votes which brings out my point of view that if the medical profession unite in a similar effort we could control the politician and his political nuisance who are seeking to further their own glory at the expense of the general public.

JOHN PETERS, M. D.

WOMAN'S AUXILIARY TO THE ILLINOIS STATE MEDICAL SOCIETY

Dear Auxiliary Member:

In response to a request from your State Publicity Chairman, Mrs. C. Otis Smith, that a message come to you from your President-Elect, I send you greetings, and a wish that you may have renewed Auxiliary spirit, and endeavor, for the coming year.

I have recently been appointed by the National Chairman of Program, as Regional Chairman of Program, for the North Central Region which entails the supervision of ten states, and I am grateful for this opportunity to urge my own Illinois Auxiliary Members to cooperate with your National, Regional, and State Officers, in carrying out the Program of Self-Education that has been launched by the National Auxiliary this year.

Our first duty is to become informed along the health lines so that we may give the laity a more intelligent conception of health and healthful living, thus only, can we hope to be an ally of the Medical Profession, and at the same time, serve the best interest of the public. Will you not appreciate the great privilege that is yours, that of being an Auxiliary Member? The informed member is ever the interested member. We cannot be enthusiastic about a subject with which we are not familiar. Pledge yourself to become an informed member this year, and plan to have programs of an educational nature exclusively in your Auxiliaries.

Material for self-educational programs will be sent to you by writing to your State Chairman of Program, Mrs. C. C. Kane, 8200 State Street, E. St. Louis, Ill., or myself.

Always devotedly yours in Auxiliary endeavor,

(Mrs. Charles Crain) Anne Winning.

WOMAN'S AUXILIARY TO THE ILLINOIS STATE MEDICAL SOCIETY

To County Program Chairman and Auxiliary Members:

As State Program Chairman I am sending you this word of greeting, wishing each Auxiliary a very successful year.

Our slogan for this year is "Be Informed to Inform Others." We should as Auxiliary members "Be Informed" on all problems that confront our Doctors, and the place to get correct information is our own Auxiliary meetings, so plan to attend faithfully this year.

County Program Chairman!!! It is up to you to plan your programs covering subjects that will help your members to "Be Informed." The Suggested Program that was sent to all County Program Chairmen and County Presidents, contains suggestions for planning your meetings and I hope you will find it helpful.

I believe your Auxiliary members would be interested in hearing the message from Dr. Chas. Skaggs (Chairman of the Illinois State Advisory Committee) that was enclosed with the Suggested Program, I would recommend his message read at your opening meeting.

If I can assist in planning your programs please write me.

Your State Program Chairman,

Nevada Kane (Mrs. C. C.),
8200 tSate Street,
E. St. Louis, Ill.

IOWA AND ILLINOIS CENTRAL DISTRICT MEDICAL ASSOCIATION

On Friday evening, December 16, there will be held the mid-winter meeting of the Iowa and Illinois Central District Medical Association, at the Le Claire Hotel in Moline, Illinois.

A ten-minute paper will be given by Dr. L. A. Dondanville of Moline, Illinois, on "Preliminary Treatment of Traumatic Cases."

Dr. Sumner L. Koch of Chicago, Illinois, will deliver an address, "Some Surgical Principles Involved in Treatment of Injuries of the Hand." The discussion will be opened by Dr. W. C. Goenne of Davenport, Iowa, followed by E. B. Neff, M. D., of Moline, Illinois.

Dr. John P. Peters of New Haven, Connecticut, will deliver an address on the following:

I. Nephritis.

II. Medical Economics.

Discussion will be opened by Francis Cenedello of Moline; J. I. Marker, Davenport. Dinner will be served at 6 P. M.

FOURTH ANNUAL POSTGRADUATE INSTITUTE

The Philadelphia County Medical Society desires to announce formally, the completion of its scientific program for the

FOURTH ANNUAL POSTGRADUATE INSTSTUTE

to be held in the Bellevue-Stratford Hotel, Philadelphia, during the week beginning March 13th, 1939. The subjects to be considered are those embraced by the terms BLOOD DYSCRASIAS and METABOLIC DISORDERS. These will be further subdivided for convenience in instruction into eighty-six clinical lectures, with open forum discussion for each topic, delivered by as many individual specialists of national distinction.

The pre-eminent position of Philadelphia as a medical center in the past has been justified by its large array of first class hospitals and contributory institutions, and that conservative scholastic atmosphere so essential to careful and dependable research. Despite the development of medical centers in other areas, Philadelphia has continued to maintain its enviable position and it has been the desire of the Philadelphia County Medical Society to release to its own members and to those of the medical profession in general, the results of the labors so diligently conducted within the walls of the city's several medical schools.

The tremendous advances in the medical sciences since the World War have increased the demands of the lay public for medical information. The development of the channels for communication have familiarized the public with medical conditions and terms to such an extent that the physician must keep himself at least informed if not intensely educated concerning the most recent work in the medical field. He cannot conduct his practice along the older lines without continuing his education in the new.

The Postgraduate Institute aims to fill this need and the participants may be assured that they will unquestionably profit by the program to be presented.

Address inquiries to The Philadelphia County Medical Society, Twenty-first and Spruce Streets, Philadelphia.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY

The next written examination and review of case histories for Group B candidates will be held in various cities of the United States and Canada on Saturday, February 4, 1939, at 2:00 P. M. Application for admission to this examination must be filed on an official application form in the office of the Secretary at least sixty days prior to this date, (or before December 4, 1938).

The general oral, clinical and pathological examinations for all candidates (Groups A and B) will be conducted by the entire Board, meeting in St. Louis, Missouri, on May 15 and 16, 1939, immediately prior to the annual meeting of the American Medical Association. Application for admission to Group A examinations must be on file in the Secretary's Office by March 15, 1939.

For further information and application blanks, address Dr. Paul Titus, Secretary, 1015 Highland Building, Pittsburgh (6), Penna.

AMERICAN BOARD OF OBSTETRICS AND GENECOLOGY

The general oral, clinical and pathological examinations for all candidates, Part II Examinations (Groups A and B), will be conducted by the entire board, meeting in St. Louis, Missouri, on May 15 and 16, 1939, immediately prior to the annual meeting of the American Medical Association. Notice of time and place of these examinations will be forwarded to all candidates well in advance of the examination dates.

Candidates for reexamination must request such reexamination by writing the Secretary's Office before the following dates: Part I—January 1, 1939; Part II —April 1, 1939. Candidates who are required to take reexaminations must do so before the expiration of three years from the date of their first examination.

Application for admission to Group A, May 1939, examinations must be on file in the Secretary's Office by March 15, 1939.

Application blanks and booklets of information may be obtained from Dr. Paul Titus, Secretary, 1015 Highland Building, Pittsburgh (6), Pennsylvania.

PASTEUR INSTITUTE IS FIFTY YEARS OLD

In the rue Dutot, on November 14, 1888, as the result of an international subscription to which many foreign sovereigns, scientists and philanthropists had contributed, the Pasteur Institute was opened. The 50th anniversary will be celebrated on December 27th, Pasteur's birthday.

The purpose of the institution was to treat hydrophobia by the Pasteur method, to prepare serotherapic inoculation liquids, and to perfect biologic chemistry. The great Pasteur Institute in the rue du Docteur-Roux in Paris today is a vast organization which has influenced medicine throughout the world, and which has "branches" in many countries—Dakar, Tangier, Tunis. . .

Pasteur himself never worked at the Institute which bears his name. His laboratories were at the Ecole Normale in the rue d'Ulm, and when he was brought to the new Institute he was already paralyzed. However, the medical and scientific pilgrims may make their way to the little chapel of the Institute where his body reposes, and in the hall which leads to the chapel they will find the busts of his aids and successors.

One of the most important sections of the Pasteur Institute today is certainly that devoted to the B.C.G.: the Calmette Guérin Bacillus. Millions of children in France alone have now been vaccinated with this serum, and the Pasteur Institute has a card catalog of them all kept up to date, so that the eventual developments may be noted.

To take one on a detailed visit to the vast establishment is beyond the means of a short article, but it would take the investigator through laboratories devoted to the study of the ferments, in beer, cheese, yeast, wine, etc., to the model hospital at the foot of the garden. Although only infectious cases are treated here, there has never been contagion: each case is placed in an isolated cabin, and before passing from one to another, the doctor changes blouse and gloves.

The present director of the Pasteur Institute is Dr. Louis Martin, successor to Dr. Roux, one of the greatest of modern French scientists, who is buried in the Court of Honor of the Institute.

Antidiptheric Vaccination now obligatory in France. It is to be noted that it was only on June 2, 1938 that it became compulsory in France for all children to be vaccinated against diphtheria. The serum used is that perfected by Dr. Roux, late director of the Pasteur Institute, and known by his name.

JUNIOR MEDICAL OFFICER (ROTATING INTERNESHIP), $2,000 A YEAR

JUNIOR MEDICAL OFFICER (PSYCHIATRIC RESIDENT), $2,000 A YEAR

St. Elizabeth's Hospital, Department of the Interior, Washington, D. C.

Applications Must Be on File with the United States Civil Service Commission at Washington, D. C., Not Later Than the Following Dates—

(a) December 13, 1938, if received from States other than those named in (b), below.

(b) December 16, 1938, if received from the following States: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming.

The United States Civil Service Commission announces open competitive examination for the positions named above. Vacancies in these positions in Washington, D. C., and vacancies in positions requiring similar qualifications in Washington, D. C., will be filled from these examinations, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion. The present entrance salaries are as stated above. If permissive legislation already proposed is passed by Congress, however, the salary of internes (Type A) may be $600 a year. The salary named is in each case subject to a deduction of 3½ percent toward a retirement annuity. A further deduction of $60 a year will be made for quarters, laundry, and medical attention. Salaries are not paid internes for the 3-month period of affiliation. All internes are required to live in the hospital, and there are no quarters for the family of married internes.

Internship.—*Junior Medical Officer (Rotating Interneship).*—The interneship consist of a 2-year rotating service of 4 months of surgery, 4 months of acute medical service, 4 months of chronic medical service, 6 weeks of obstretics (affiliation), 6 weeks of pediatrics (affiliation), 3 months of general laboratory work, and 6 months of psychiatry (American Medical Association Classification 1, Type A).

Junior Medical Officer (Psychiatric Resident).—A postgraduate interneship of 1 year in psychiatry (American Medical Association Classification 2, Type B) is offered to graduates in medicine who have already served an accredited interneship.

Caution.—Applicants should state definitely in their applications whether they are applying for the position of Junior Medical Officer (Rotating Interneship) or for the position of Junior Medical Officer (Psychiatric Resident).

Probable Vacancies.—It is expected that there will be two vacancies July 1, 1939, and two vacancies October 1, 1939, for Type A interneship; and in the fiscal year beginning July 1, 1939, that there will be approximately five vacancies for psychiatric residents (Type B).

Duties.—*Junior Medical Officer (Rotating Interneship).*—Under immediate supervision, to admit patients, take histories, make physical examinations, and record findings; to make ward rounds of inspection, note charts, and record observations; to prescribe for minor ailments or for acute emergency cases; to dispense medicine in emergencies; to perform minor surgical operations; to assist at major operations and in redressing; to administer anaesthetics; to make routine laboratory tests and analyses; to assist at out-patient clinics in dressing, and in administering vaccines; to keep records, make up case histories; and to compile statistics requiring medical training.

Junior Medical Officer (Psychiatric Resident).—To take histories; to make physical and mental examinations and to record the findings; to make rounds of inspection; to make notes; to prescribe for and treat minor ailments; to answer correspondence relative to patients; and to assist the chief of the service to which assigned in all the administrative and professional duties of the service.

Basis of Rating.—Competitors will not be required to report for examination at any place, but will be rated on the extent of their education and on the extent and quality of their experience and fitness which are relevant to the duties of the position applied for, on a scale of 100, such ratings being based upon com-

petitors' sworn statements in their applications and upon corroborative evidence.

Statements concerning qualifications will be verified by the Commission; exaggeration or misstatement will be cause for disqualification.

PROOF OF GRADUATION.—The names of fourth-year students will not be certified for appointment until a certificate of graduation as B. M. or M. D. is filed. The names of persons who are now serving, but who have not yet completed, the interneship required under the examination for Junior Medical Officer (Psychiatric Resident) will not be certified for appointment until a certificate of the completion of the interneship is filed.

CERTIFICATION.—Certification to fill vacancies in these positions will be made of the highest eligibles on the appropriate register from the entire country who have not expressed unwillingness to accept appointment where the vacancy exists. The department or office requesting certification of eligibles has the legal right to specify the sex desired.

FINGERPRINTS.—Fingerprints will be taken of all persons appointed from these examinations.

APPLICATION FORMS.—The necessary forms may be obtained from the *Secretary, Board of United States Civil Service Examiners, at any first-class post office,* from the United States Civil Service Commission, Washington, D. C., or from the *United States Civil Service district office* at any of the cities given below (the title of the examination desired should be stated):

Atlanta, Ga., New Post Office Building.
Boston, Mass., Post Office and Courthouse Building.
Chicago, Ill., New Post Office Building.
Cincinnati, Ohio, Post Office Building.
Denver, Colo., Post Office Building.
New Orleans, La., Customhouse.
New York, N. Y., Federal Building, Christopher Street.
Philadelphia, Pa., Tenth Floor, Gimbel Building.
Seattle, Wash., Federal Office Building.
St. Louis, Mo., New Federal Building.
St. Paul, Minn., New Post Office Building.
San Francisco, Calif., Federal Office Building.
Honolulu, T. H., Federal Building.

Balboa Heights, Canal Zone, *Secretary, Board of United States Civil Service Examiners.*

San Juan, P. R., *Chairman, Puerto Rican Civil Service Commission.*

The exact title of the examination desired, as given at the head of this announcement, should be stated in the application form.

MISSISSIPPI VALLEY MEDICAL SOCIETY

The fifth annual meeting of the Mississippi Valley Medical Society will be held in the new $500,000.00 Municipal Auditorium (to be ready June 1, 1939) at Burlington, Iowa, September 27, 28, 29, 1939. The magnificent new Auditorium at Burlington, only two blocks from the headquarters hotel, will afford the Society the largest and finest meeting place it has ever had. A wonderful Exhibit Hall is being planned which will afford both technical and scientific exhibitors, the largest floor space in the history of the Society.

The Society's officers for 1939 (elected Nov. 20, 1938) are as follows:

President, M. Pinson Neal, M. D., Columbia, Mo. (Elected 1937.)

President-Elect, John T. Hanna, M. D., Burlington, Iowa.

1st Vice-President, Joel W. Hardesty, M. D., Hannibal, Mo.

2nd Vice-President, Lindon Seed, M. D., Chicago, Ill.

3rd Vice-President, William M. Hogle, M. D., Keokuk, Iowa.

Secretary-Treasurer, Harold Swanberg, M. D., Quincy, Ill. (Re-elected.)

The following were recently elected to membership on the Board of Directors of the Society:

A. H. Bitter, M. D., Quincy, Ill.
James Graham, M. D., Springfield, Ill.
C. F. Harmon, M. D., Springfield, Ill.
W. L. Hanson, M. D., E. St. Louis, Ill.
C. C. Maher, M. D., Chicago, Ill.
W. C. Goenne, M. D., Davenport, Iowa.
K. A. Meyer, M. D., Chicago, Ill.
Edmund Lissack, M. D., Concordia, Mo.
Q. U. Newell, M. D., St. Louis, Mo.
Dan G. Stine, M. D., Columbia, Mo.
F. E. Sultzman, M. D., Hannibal, Mo.
F. G. Ober, M. D., Burlington, Iowa.
E. J. Lessenger, M. D., New London, Iowa.

MISSISSIPPI VALLEY MEDICAL SOCIETY 1939 ESSAY AWARD

The Mississippi Valley Medical Society offers a cash prize of $100.00, a gold medal and a certificate of award for the best unpublished essay on a subject of interest and practical value to the general practitioner of medicine. Entrants must be members of the American Medical Association. The winner will be invited to present his contribution before the next annual meeting of the Mississippi Valley Medical Society at Burlington, Iowa, September 27, 28, 29, 1939, the Society reserving the exclusive right to first publish the essay in its official publication—the *Mississippi Valley Medical Journal* (incorporating the *Radiologic Review*). All contributions must not exceed 5,000 words, be typewritten in English in manuscript form, submitted in five copies, and must be received not later than May 1, 1939. Further details may be secured from Harold Swanberg, M. D., Secretary, Mississippi Valley Medical Society, 209-224 W. C. U. Building, Quincy, Ill.

The 1938 winning essay, as well as several other essays which received meritorious consideration in the 1938 Essay Contest, appears in the January, 1939, issue of the *Mississippi Valley Medical Journal* (Quincy, Ill.).

Book Reviews

THE PRACTICE OF MEDICINE. By Jonathan Campbell Meakins, M. D. Second Edition. With 521 Illustrations, Including 43 in Color. St. Louis. C. V. Mosby Company. 1938. Price, $12.50.

Since the appearance of the first edition many new discoveries in functional pathology, etiology and prevention and cure of disease have appeared in rapid succession. Everything that is new and reliable have been incorporated in this second edition. The work is strictly up-to-date and should be in the library of every up-to-date physician.

HUMAN PATHOLOGY. By Howard T. Karsner, M. D. 18 Illustrations in Color and 443 Black and White. Fifth Edition Revised. Philadelphia & London. J. B. Lippincott Company. 1938. Price, $10.00.

This edition is intended as a text-book. This work is a veritable mine of practical information. The text is lucid; the illustrations are precise and appropriate. It is no doubt the most scholarly of all the standard works on the subject.

UROLOGY. By Daniel N. Eisendrath, M. D., and Harry C. Rolnick, M. D. 750 Black and White Illustrations and 12 in color. Fourth Edition, Entirely Revised and Reset. Philadelphia, Montreal, London. J. B. Lippincott Company. 1938. Price, $10.00.

The fact that the work has gone through four editions in ten years is ample evidence of its popularity. The work has been completely revised and rearranged for more forceful teaching presentation and more ready accessibility for general use.

DOCTOR COLWELL'S DAILY LOG FOR PHYSICIANS. Issued by the Colwell Publishing Company, Champaign, Illinois. Designed by a physician for physicians. For the year 1939. This is the twelfth annual edition.

This is one of the most practical and simple systems of bookkeeping yet offered for physicians. It offers a bird's-eye view of medical man's daily financial condition.

Present day medical schools provide little or no training in bookkeeping. Many physicians, unacquainted with the Log and using crude methods of their own invention, will welcome the 1939 Daily Log for Physicians.

After years of experience, we have come to believe that the Log's biggest job is that of providing a display of Important income and expense items. Figures that are essential not only for income tax returns, but for budgets, legal aids, watching progress.

Subsidiary to the financial records are several memorandum forms; records of inoculations, surgery, obstetrics; government-required records of narcotics dispensed and social security tax figures.

This means of medical bookeeping was devised by a physician with an excellent background of city and country practice. It is edited annually by him in the light of new needs suggested by users.

DR. BRADLEY REMEMBERS. A novel by Francis Brett Young, author of "They Seek a Country." New York. Reynal & Hitchcock. 1938. Price, $2.75.

Of all living writers of the first rank, Mr. Young is the one most suited to writing a truly great story of a doctor's life. Before he turned to letters as a profession, this distinguished novelist was himself a doctor; several of his earlier works have already been permeated with the authentic smell of the surgery and the whited silence of the hospital. Now he has drawn on his own rich experience to create a three-dimensional, undistorted portrait of a doctor's life.

There have been many previous novels purporting to present the inside view of the medical profession, and not always to its advantage. "Doctor Bradley Remembers" is, we feel, a human, heart-warming, essentially truthful story of a typical physician of the old school, whose life was spent in the service of the people whose lives he touched.

SANITIZATION OF THE DRINKING GLASS. Part One—Methods and Procedures, by Jack G. Baker. Part Two—Practical Control, by Raymond V. Stone, D.V.M. Los Angeles. National Association of Sanitarians.

Los Angeles, Calif.—The germ-infected drinking glass in taverns and soda fountains was condemned by the National Association of Sanitarians as having negated the elaborate safeguards set up by public health officials to provide a safe and wholesome food supply. The announcement was contained in a sanitarian's manual of instruction issued by the association and titled "Sanitization of the Drinking Glass."

"Dirty dishes, glasses and utensils," it said, "harbor the very disease-producing organisms that have been so carefully guarded against up to the point of use." An increase in the number of food and drink places generally and the fact that an increasing number of people eat away from home combine to "make the dish and utensil problem one of major public health importance."

A MANUAL OF REPARATIVE PLASTIC SURGERY. By J. Eastman Sheehan, M. D. With 314 illustrations and 18 full-page plates. New York, London. Paul B. Hoeber, Inc. 1938. Price $5.50.

This volume is offered to the surgical profession first as an up-to-date statement of the service to be had from the tissues of the body and of what they demand by way of respect if they are to afford the maximum of such service; and second, as a compendium of information covering many varieties of surgical intervention with a view to plastic repair. The manual, with admirable previty, presents the fundamental principles of plastic repair, plastic materials available and their choice, wound treatment, etc., as well the detail of surgical techniques and procedures for plastic repair on all parts of the body. It will be a welcome addition to the active surgeon's working library by one known as a master of his subject.

Original Articles

CANCER OF THE LARYNX

WITH THE DESCRIPTION OF A NEW INSTRUMENT FOR INTRALARYNGEAL IRRIDATION

FRANK E. SIMPSON, M.D.
CHICAGO

Cancer of the larynx may be 1. extrinsic, originating in the walls outside the cavity of the larynx 2. intrinsic, originating in the interior of the larynx 3. mixed, due to an extension of extrinsic cancer to the interior or intrinsic cancer to the exterior of the larynx.

Many advanced cases may be included under mixed cancer, it being impossible in most cases of this type to determine the exact point of origin. Secondary deposits in the larynx from cancer elsewhere in the body are practically unknown.[1]

EXTRINSIC CANCER

Extrinsic cancer may start on the epiglottis, arytenoids, ary-epiglottic folds, pyriform sinuses or the pharyngeal surface of the cricoid cartillage. It is nearly always squamous celled carcinoma.

Usually of highly anaplastic type, it extends more or less rapidly to adjacent tissues, and metastasizes early to the lymph nodes of one or both sides of the neck.

The first symtom of extrinsic cancer is usually discomfort in swallowing.

Laryngoscopic examination is necessary to detect the site of the tumor which may appear as a dusky red, dirty white, or greyish swelling or as an irregular, sloughing, easily bleeding ulceration, a few millimeters to one or more centimeters in diameter.

Biopsy is necessary for a positive diagnosis.

Treatment. Surgery: Surgical procedures in extrinsic cancer "entail a formidable operation with high operative and post-operative mortality and morbidity and furnish an extremely small percentage of permanent cures."[2]

For these reasons most authors believe that irradiation of some type is the method of choice in extrinsic cancer.

Irradiation. X-rays by the Coutard method have been said to yield approximately 15% of lasting cures.[2] Palliative effects are the rule.

Locally we use irradiations with radon to the mucous membrane surface of the tumor. An applicator measuring 2x2 cm. containing 500 mc. of radon screened with 2 mm. of silver and 5 mm. of rubber may be applied daily in seances of 5 to 10 minutes each for a total of 750 to 1000 mc. hrs.

The implantation of radium or radon needles or "seeds" (radium puncture) is seldom indicated. If undertaken, it should be used with a full understanding of possible destructive effects.

The radium bomb to the external cutaneous surface over the tumor is also used in conjunction with internal surface treatment.

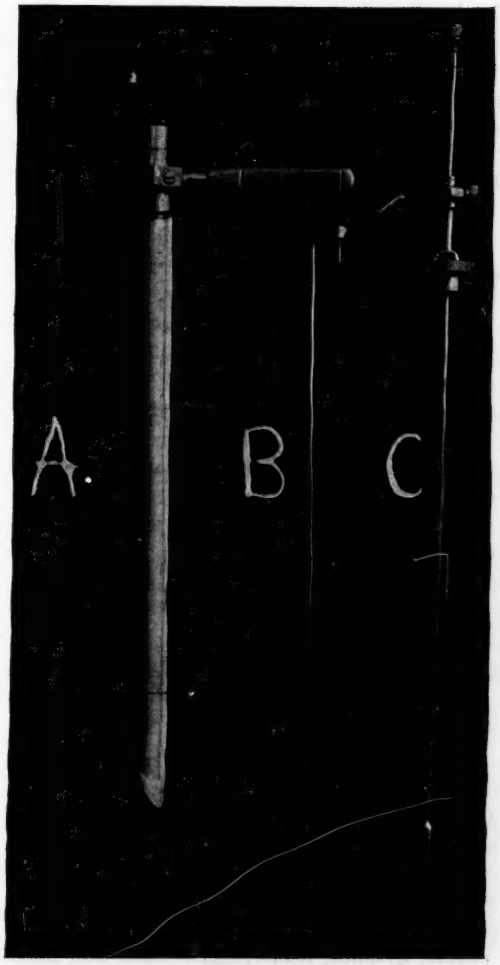

Fig. 1.
A. Aluminum tube.
B. Mignon light carrier.
C. Gold radon capsule and carrier.

INTRINSIC CANCER

Intrinsic cancer may arise from the true vocal cord, the ventricle, ventricular band, the interarytenoid or subglottic area.

Early Stage. As one true vocal cord is the commonest site, persistent hoarseness is usually the first symptom. The hoarseness may be progressive.

In 66 cases, Schmiegelow[3] found that the vocal cord was the point of origin in at least 36.

Cancer of the true vocal cord metastasizes late to the adjacent lymph nodes of the neck as the cartilaginous box of the larynx is poorly supplied with lymphatics.

When cancer starts in the ventricle, ventricular band or the interarytenoid region discomfort or pain is the first symptom.

St. Clair Thomson says: "Any continuous discomfort in the throat or any hoarseness lasting more than 3 weeks in a patient over 40 years of age should call for a thorough examination of the larynx by a skilled laryngologist."[4]

Subglottic cancer usually arises on the inner or under surface of the vocal cord or in the subglottic area. It may grow to a considerable size before giving rise to symptoms—interference with speech, respiration or swallowing.

It involves the regional lymph nodes of the neck early.

Late Stage. Situated on the vocal cord, cancer may be confined to the surface or margin of the cord for months or even several years. Sooner or later the growth spreads, usually forward along the cord, reaches the commissure and encroaches on and obstructs the glottis. There may then occur:

1. Increasing interference with speech, respiration and swallowing. Cough is usually absent but may occur. Aphonia, intense dyspnea (requiring tracheotomy) and serious dysphagia may develop.
2. Pain often radiating to the ear and head.
3. Hemoptysis. Sometimes tumor tissue is coughed up.
4. Fetor and salivation.
5. Sepsis—fever, loss of strength, appetite and weight.

Death may result from a combination of asphyxia, dyspnea, hemorrhages, sepsis and pneumonia.

Laryngoscopic Examination. Occurring most commonly on the middle or anterior third of one cord, early cancer may affect an area only a few millimeters in extent. It may appear as a persistent reddish area, which may be roughened or thickened; a whitish area giving an irregular, fringe-like border to the cord; a white, pinkish or reddish-grey lump, which may be "cupped" or retracted in the center; a nodular or warty lump; an irregular ulceration; any combination of these appearances.

Mobility of the Cord. Early cancer situated on the true cord does not necessarily impair its mobility.

Late cancer impairs the mobility and may "fix" the cord.

A mobile cord therefore does not speak against malignancy.

Impaired mobility or fixation of the cord on phomation speaks for the malignancy of a neoplasm but is not diagnostic as a paretic cord may be injected and give the appearance of malignancy.

On the ventricle, ventricular band or interarytenoid region, cancer usually appears as an irregular, greyish, easily bleeding ulceration.

St. Clair Thomson says:

"It is as important as it is difficult to recognize these early appearances of cancer. Suspicion should be aroused if a definite, unilateral growth which might at first suggest a benign neoplasm occurs in a patient over 40, especially if there is an infiltration or impairment of action in the cord, if it is situated in the middle or anterior third of the larynx and if the surface is white or greyish."[5]

DIAGNOSIS

A general diagnostic survey is indicated including examination of sputum, blood and chest with Roentgenograms.

Tuberculosis and cancer, syphilis and cancer or all three diseases may coexist in the larynx. Repeated laryngoscopic examinations should be made.

One must differentiate:

1. Simple inflammations (chronic laryngitis).
2. Granulomas (tuberculosis, syphillis, rhinoscleroma).
3. Benign tumors (singer's nodule, keratosis, pachydermia, papilloma, fibroma, angioma, enchondroma).
4. A foreign body, blood clot, submucous hemorrhage, or prolapse of the ventricle.

Biopsy. Biopsy is necessary to establish beyond doubt a diagnosis of cancer, sometimes more than one biopsy being required. Biopsy should be performed by the expert laryngologist.

In the famous case[6] of the Crown Prince, afterward Frederick III of Prussia, a persistent hoarseness was noted in January 1887. Laryngoscopic examination disclosed on the left vocal cord near the middle third a "pale red nodule" about 4 mm. long and 2 mm. high. Biopsy was performed by Morrell Mackenzie, in May, 1887, the sections being examined by Virchow.

Unfortunately Virchow reported that the tissue submitted indicated a benign tumor although one "cell nest" was found.

This report led to long continued and disastrous attempts to treat the growth by intralaryngeal surgical measures. The disease was soon found to be malignant and terminated fatally in June, 1888, one and one-half years from the beginning of the symptoms.

Pathology. Intrinsic cancer of the larynx is nearly always squamous celled. Occasionally basal celled carcinoma and adenocarcinoma occur.

Rarely endothelioma and sarcoma are found.

Of 60 cases of intrinsic carcinoma of the larynx treated by St. Clair Thomson, 33 were graded 1 and 2; 27 were graded 3 and 4.[7] Grades 1 and 2 are usually considered somewhat radioresistant; 3 and 4 radiosensitive.

Harris and Klemperer[8] concluded that with protracted Roentgen therapy the histologic structure was of minor importance in determining the radio resistance of laryngeal carcinoma.

TREATMENT

Surgery. Intralaryngeal excision, "window" resection, laryngofissure, hemilaryngectomy and total laryngectomy have been proposed for early intrinsic carcinoma.

If surgery is chosen as the method of treatment, laryngofissure is probably the operation of choice.

To be successful, laryngofissure should be restricted to early and very carefully selected cases in which the cancer is limited to one cord, the false cord not being involved, and in which the growth extends but a short distance past the midline at the anterior commissure. The operative mortality varies with different surgeons from zero to 25%; the cure rate from 7.7% to 87%.

Jackson had 79% of 3 year cures in 29 cases.[9] The talking voice is preserved to a greater or less degree but the singing voice is lost. Total laryngectomy may be indicated in more advanced cases in which, however, the disease is still intrinsic. In the most skillful hands total laryngectomy has an operative mortality of 3.2%.

MacKenty had 88.7% of lasting cures in 89 cases.[10]

The voice is of course lost but vocal substitutes are fairly satisfactory. Quick[11] believes "the present status of radiation therapy renders total laryngectomy obsolete."

X-Rays. Buckley and Hoffman[2] believe operable, intrinsic carcinoma should be treated by surgical operation; inoperable intrinsic carcinoma by some form of irradiation.

At the present time the so-called Coutard technic is usually employed. Daily divided doses are given to the cutaneous surface over the larynx for a period of 21 to 42 days.

Coutard achieved 32% of 3 year cures in 77 cases.[12]

Radium. Various methods have been used.

1. The radium "bomb" may be applied to the cutaneous surface over the larynx. There have been a few lasting cures.

2. The Ledoux-Harmer-Finzi method.[13] A window is made surgically in the thyroid cartilage on the side of the growth and radium needles are applied exterior to the mucosa over the lesion. With this method necrosis of the cartilage may theoretically be avoided.

There have been a few lasting cures.

3. Radium or radon needles or "seeds" have been implanted directly into the tumor after laryngofissure and tracheotomy. This method gives rise to pain and there is danger of necrosis of the laryngeal cartilages. While there have been a few lasting cures we believe radium puncture is contraindicated as a routine procedure.

4. Intralaryngeal irradiation.

With the older methods of introducing radium or radon into the larynx the patient's breathing was often obstructed by the applicator. The laryngeal cartilages were sometimes injured because of the impossibility of maintaining a proper distance between the radium and the inner laryngeal wall.

In the writer's book, Radium Therapy,[14] published in 1922, an intralaryngeal applicator devised by Dr. O. T. Freer and the writer was

described. This applicator was subsequently discarded because of technical difficulties.

We have devised an intralaryngeal instrument[15] modelled after the Jackson bronchoscope which minimizes or overcomes the difficulties mentioned.

DESCRIPTION OF INSTRUMENT

The instrument consists of 3 parts: (A) an aluminum tube (B) a mignon light carrier (C) a gold radon capsule attached to one end of a steel or nickel radon carrier. Instead of gold the radon capsule may be made of platinum.

The aluminum tube has the following dimensions: length, 26 cm.; outside diameter, 10 mm.; thickness of wall, 1 mm.

The tube is open at both ends so that air passes freely through it thus allowing the patient to breath comfortably during the treatment. Aluminum was chosen for this part of the instrument in order to absorb the secondary rays of Sagnac which may be irritating or even caustic.

The mignon light carrier slides in a groove in the wall of the aluminum tube. The distal end of the tube may thus be lighted up to facilitate its insertion into the larynx.

The gold radon capsule has the following dimensions: length, 4.5 cm.; outside diameter, 5 mm.; wall thickness, 1 mm. It contains two powerful glass radon tubes enclosed in two standard enameled silver screens placed end to end.

Technic. The patient is given 1/4 grain of morphine sulphate and 1/100 grain of atropine sulphate hypodermically one-half hour prior to the treatment. The pharynx and interior of the larynx are anesthetized with 2% pontocaine hydrochloride.

After insertion of the aluminum tube containing the light carrier into the larynx between the true vocal cords until the distal end lies 2 cm. below the cords, the gold radon capsule is introduced into the aluminum tube until the end of the capsule is flush with the end of the aluminum tube.

Three small flanges on the radon carrier hold the radon capsule exactly in the center of the aluminum tube but do not obstruct the lumen and hence do not interfere with breathing.

Treatments last 10 or rarely 15 minutes and may be repeated in from 2 to 5 day intervals depending on the indications. Longer treatments can be given but are not advisable. One should use in addition radium bomb treatments to the cutaneous surface over the larynx.

Dosage. Critics have said that those who use radium have no unit of dosage such as the roentgen in X-ray therapy.

There is some justification for this criticism. However, if one is given complete data, i. e., the quantity of radium—the size, number and arrangement of the radium tubes—the screening—the distance of the tubes from the tumor—the duration of each treatment and the frequency of its repetition, the correct dosage can always be worked out with reasonable accuracy.

We use radium and radon interchangeably as one millicurie of radon is equivalent to one milligram of metallic radium.

In the interior of the larynx we use radon because of the possibility of concentrating a large quantity of radon in a very small tube.

Experimental Data. If we apply a radon tube 14 mm. long screened with 1 mm. of gold and 1 mm. of rubber in contact with the skin, the erythema dose is found to be 118 mc. hrs.

At 12 mm. distance the erythema dose is found to be 236 mc. hrs.

At 5 mm. distance, the distance at which we treat carcinoma of the larynx, we have calculated the erythema dose to be 153 mc. hrs.

These experiments and calculations are for the radon tube applied in one seance.

If we increase the number of seances to 9 and spread the dose over 4 weeks, we estimate that the dose may be increased by 60%. 60% of 153 is approximately 91 and this added to 153 gives 244. In other words, a total of 244 mc. hrs. given in 9 seances is the erythema dose given with a radon tube 14 mm. long screened with 1 mm. of gold plus 1 mm. of rubber and placed 5 mm. from the surface of the skin.

In the larynx we use 2 radon tubes, each 14 mm. long, placed end to end. The erythema dose may therefore be expressed as 488 mc. hrs., i. e., twice 244. The actual erythema dose is somewhat less than this due to the contribution of the rays from tube number one to tube number two and vice versa.

TREATMENT OF CARCINOMA

Unfortunately there is no such thing as a carcinoma dose because different carcinomas show different degrees of radiosensitivity and therefore require different doses.

We use the term—toleration dose.

In other words, we give to the tumor a dose based on experience which we believe the normal tissue will tolerate without seriously impairing its integrity.

In the larynx one should be extremely careful not to exceed the toleration dose.

Lymph Nodes of Neck. For convenience the treatment of enlarged lymph nodes of the neck secondary to all types of laryngeal cancer may be referred to at this point.

No blanket rule can be laid down to cover all contingencies and all cases. It is impossible to tell positively without a microscopic examination of the nodes whether they are carcinomatous or inflammatory.

If one submaxillary node is enlarged, hard and insensitive so that it is regarded as carcinomatous, surgery is the method of choice. The results are good.

If other nodes are involved the results of surgery are poor, irradiation being the method of choice. Unfortunately the results of irradiation are also poor although a good deal of palliation may be obtained. We always use surface irradiation—never radium "puncture."

If large groups of nodes in the neck resolve under irradiation we regard the condition as inflammatory or as highly anaplastic and therefore radiosensitive carcinoma.

REPORT OF CASE

Mrs. X, 80 years old, became hoarse in October, 1937. In March, 1938, when she could scarcely speak above a whisper, she entered the Central Free Dispensary (Rush Medical College) Chicago—service of Dr. E. W. Hagens.

History of Patient—One interesting fact was noted—the patient's son died at the age of 42 of cancer of the larynx 12 years previously, i.e., in 1925. The son was an inveterate smoker of cigarettes—the patient herself had never used tobacco or been subjected to known laryngeal irritation.

Laryngoscopic Examination—Examination by Dr. E. W. Hagens disclosed on the anterior third of the right vocal cord a pale red nodule, 6 mm. long and 4 mm. high. Both cords were freely movable.

Biopsy by Dr. Hagens revealed squamous celled carcinoma, Grade 2.

Radium treatment was begun April 7, 1938, with the intralaryngeal instrument described.

PROTOCOL OF INTRALARYNGEAL IRRADIATIONS

April 7, 1938	347 mc. for 10 minutes	57.8 mc. hrs
April 11, 1938	438 mc. for 10 minutes	73 mc. hrs.
April 14, 1938	198 mc. for 10 minutes	33 mc. hrs.
April 18, 1938	180 mc. for 15 minutes	45 mc. hrs.
April 20, 1938	155 mc. for 10 minutes	25.8 mc. hrs.
April 25, 1938	278 mc. for 10 minutes	46.3 mc. hrs.
April 29, 1938	330 mc. for 10 minutes	55 mc. hrs.
May 2, 1938	273 mc. for 10 minutes	45.5 mc. hrs.
May 5, 1938	322 mc. for 10 minutes	53.6 mc. hrs.
	Total 95 minutes	435 mc. hrs.

External Surface Irradiations—During this period—April 7 to May 5, 1938—5000 mc. hrs. were given to the cutaneous surface over the larynx with the radium bomb at 4 cm. distance.

There was no pain at any time from the intralaryngeal or external irradiations.

Subsequent History of Patient.—On May 1, 1938, the patient's speaking and singing voice was restored and has remained unimpaired.

On June 1, 1938, the vocal cords appeared normal and have remained well to the time of writing.

A motion picture of the technic of treatment and a phonographic record of the patient's speaking and singing voice made October 6, 1938, were exhibited at a meeting of the Chicago Laryngological Society, November 7, 1938 and again at a meeting of the Chicago Roentgen Society, November 10, 1938.

COMMENT

Persistent hoarseness without obvious cause in persons past 40 should be regarded as very suggestive of cancer of the vocal cord. Early diagnosis and treatment are most desirable.

The intralaryngeal method described has the following advantages:

1. It is non-operative, a desirable feature in elderly and feeble patients.
2. The method is painless.
3. The patient's breathing is free and unobstructed during treatment.
4. The radon is held at a fixed distance—5 mm.—from the surface of the tumor so that dosage is accurate.
5. Danger of injury to the larynx is minimized.
6. The speaking and singing voice may be restored.
7. If irradiation fails, operation can still be resorted to if advisable.

While designed especially for intrinsic carcinoma of the larynx, the instrument can also be used for benign lesions such as keratosis of the cord or angioma of the larynx.

It can also be adapted to subglottic lesions and lesions of the bronchus or esophagus of suitable character.

The intralaryngeal method may be advantageously combined with irradiation with the radium bomb or x-rays applied to the cutaneous surface over the larynx.

It is perhaps unnecessary to point out that intralaryngeal irradiation should be used only by one skilled in the use of the bronchoscope.

For help in the development of the intralaryngeal instrument and the treatment of cases, I am greatly indebted to Drs. E. W. Hagens, W. Bond, D. E. Brown and to my associates Dr. J. E. Breed, and J. S. Thompson, Ph.D., to all of whom I wish to express my thanks.

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TRAUMATIC RUPTURE OF THE MALE URETHRA

HARRY CULVER, M. D.

CHICAGO

The extent of this discussion, by title, should include such lesions of the urethra as gunshot wounds, injuries produced by sharp penetrating objects, false passages by intra-urethral instruments and necrosis from pressure, as well as the more common and therefore much more important lesions of the male urethra associated with fractures of the bony pelvis and urethral lesions resulting from straddle injuries.

Read before Section on Surgery, Illinois State Medical Society, May 17, 1938, Springfield.

The necessity for detail in describing the normal and pathological anatomy involved in presenting a reasonably clear clinical picture of urethral trauma associated with fractures of pelvic bones and likewise with straddle injuries, limits my discussion to these two groups of lesions. My time will therefore be used exclusively in a clinical discussion of these lesions as understood from the management of thirty-two patients thus afflicted.

For an understanding of these conditions, sufficient to make a logical diagnosis and carrying out subsequent management, a detailed mental picture of the local anatomy must be held by the surgeon. To be sure, the history of the type of trauma received together with the physical findings, including films, are imperative, but a complete picture of all possibilities can only be had by having more than a superficial understanding of the anatomy possibly involved.

The triangular ligaments, or urogenital diaphragm, is a dense fibrous tissue of two parallel layers about one centimeter apart, firmly fixed to the bony pelvis along each descending ramus from the symphysis down almost to the ischial tuberosities, thus firmly separating the deep pelvic structures from the superficial structures.

The male urethra penetrates this structure perpendicularly near its center; obviously the urethra here is a fixed structure, which renders it vulnerable at this point. Ruptures of the urethra above this diaphragm may result in extravasation of blood and urine which will regularly be confined to tissues above the urogenital diaphragm. The course and extent of the extravasation upward is determined by periprostatic and perivesical fascial cleavage planes and by the force exerted by the contracting bladder. Ruptures of the urethra below the urogenital diaphragm may result in extravasation of blood and urine which regularly is confined distal to this diaphragm. Combined lesions rarely occur.

Straddle injuries of the male urethra are produced by direct sudden force applied against the perineum, usually caused by the patient falling astride some fixed object. The force of the fall does not necessarily wholly determine the extent of the urethral injury. Some seemingly minor accidents may result in the most severe urethral damage. The angle at which the force is applied

is an *important factor. Upward and backward* force on the urethra against the fixed triangular *ligaments* or against the arch of the symphysis may be relatively slight and still produce great urethral damage, while a similar force applied upward and forward is certain to cause less severe urethral damage or none at all.

The clinical picture varies with the extent of the injury. Minor degrees of urethral rupture, when encountered early, may present a patient with slight but constant urethral bleeding from the meatus associated with *excruciating* perineal pain; there may or may not be any interference with urination. *Examination* of the perineum will show only slight swelling or none at all. This same patient several hours later may have urinary retention caused by local edema and periurethral hematoma, while the perineum presents an ecchymosis of the skin and a semifluctuating mass. The local pain remains constant or is increased by pressure from hematoma.

Such a patient seen early, without severe urethral *bleeding and with no apparent interference* with urination, should be treated with *morphine, ice packs locally* and frequent observation. There is no indication for attempting to pass a urethral catheter; it only increases the possibility of local infection, which is sometimes a factor which determines whether conservative management shall be continued *or surgery* becomes necessary. Under conservative management the *development of an appreciable perineal* hematoma without interference of urination, a *perineal incision to evacuate the clots* only, is indicated; urethrotomy may not be necessary. Should the urethral bleeding be considered too severe and a catheter can be readily passed to the bladder, it should be left indwelling and perineal pressure applied. Bleeding may be controlled and surgery prevented.

Obviously those patients with interference of urination, perineal hematoma and an impassable urethra are at once in need of surgical treatment. There are many variations of clinical pictures between these two extremes and, while conservatism is a desirable trait when local conditions are understood and clinical progress is evident, procrastination often results in the loss of valuable tissue. Early surgical treatment is the only way devitalized urethral and periurethral tissues can be saved.

These lesions are distal to the urogenital diaphragm *and therefore should be surgically* approached through the perineum. An external *urethrotomy is made*, hematoma removed, and a catheter placed in the bladder through the perineal urethrotomy. In severe urethral lacerations some difficulty may be encountered in recognizing the proximal uethral opening. Some help may be had here by having a good perineal exposure, bleeding reasonably controlled, then having an assistant *press over the bladder region* suprapuically. Expressed urine sometimes *directs the operator's attention to its outlet.* This procedure has been successful for me in three *patients. If this fails* and a reasonably long, intelligent search has been made unsuccessfully, it is much safer surgery to do a cystotomy and

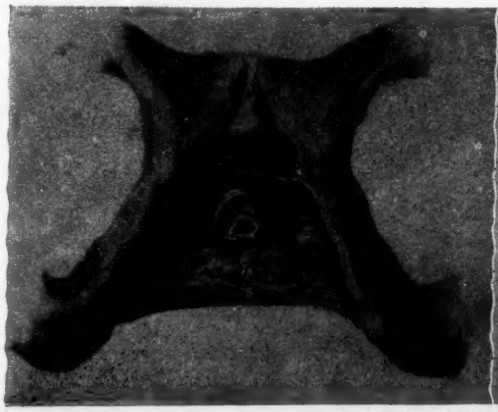

Fig. 1. (Left) Dissection *showing anterior layer of* triangular ligament and its attachment to the bony *pelvis. Note the perpendicular* penetration of the urethra.

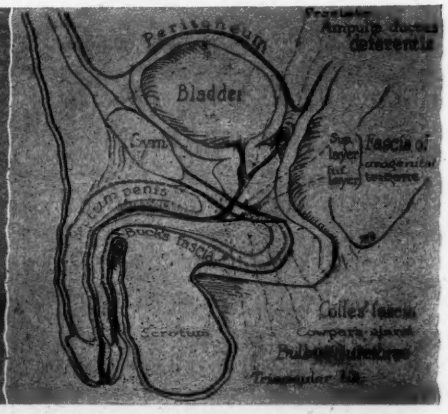

Fig. 2. (Right) Drawing to show the various fascial tissues involved in deep and *superficial extravasation.*

retrograde sounding than to indefinitely probe and stab blindly. After the perineal catheter is placed in the bladder it may be closed suprapubically; however, a suprapubic bladder drainage tube adds safety to the operation and in my experience does not prolong the convalescence.

Should there be complete separation of the entire circumference of the urethra, approximation by a single suture on the roof suffices for a bridge for complete repair; however, if it is technically feasible to make an end-to-end anastomosis of more of the entire circumference, there is correspondingly less postoperative stricture. Technical inability to bring the proximal and distal ends together at any point naturally results in dense stricture, difficult but not impossible of successful conservative postoperative management. Careful regular sounding results eventually in complete epithelialization of the intervening area. Tissue transplants have not been successful.

Fourteen of the thirty-two patients with ruptured urethra had straddle injuries with no mortality. Ten of these had external urethrotomies, seven of them combined with cystotomy and retrograde catheterization, while four had conservative treatment. One patient was moved from another hospital three months after injury. He had had urinary difficulty, but not complete retention. A large perineal hematoma became infected and opened spontaneously, resulting in multiple perineal scrotal and inguinal fistulae. Ten months more hospitalization and five operative attacks were necessary to do what might have been done readily with one early operation with a hospital stay of three weeks, which was the average stay of those so managed.

Experience has shown that after hemorrhage and urinary retention have been cared for, the most damaging factor is local sepsis. It makes for long-standing urinary fistulae and finally more marked local fibrosis characterized clinically by more resistant urethral strictures. Local sepsis can best be prevented by early surgical management.

Regardless of the type of early management of these lesions, whether conservative or surgical, it is imperative that they have regular urethral soundings at increasing intervals for years; patients have been successfully treated non-surgically, then allowed to pass from observation until tight traumatic strictures have formed.

Three of these fourteen patients complained of impotency. Two of them recovered spontaneously within two years.

The vast number of severe automobile accidents in recent years has greatly increased the incidence of fractured pelves, therefore a proportionate increase in associated ruptures of the posterior urethra. In my series there are eighteen such lesions of the urethra. Due in great part to severe injuries of other structures, there is a great morbidity and relatively high mortality.

Fracture of either descending ramus of the

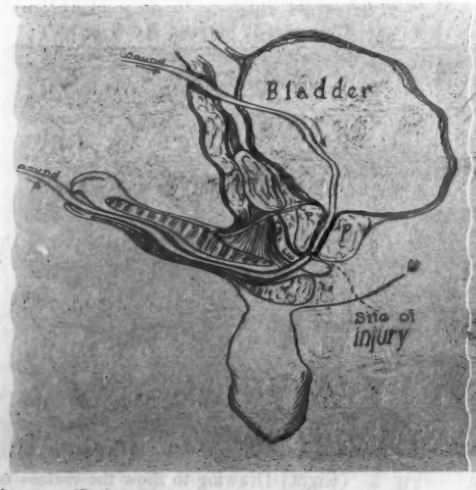

Fig. 3. (Left) The two-sound technic of reestablishing the continuity of the urethra ruptured by a fractured pelvis.

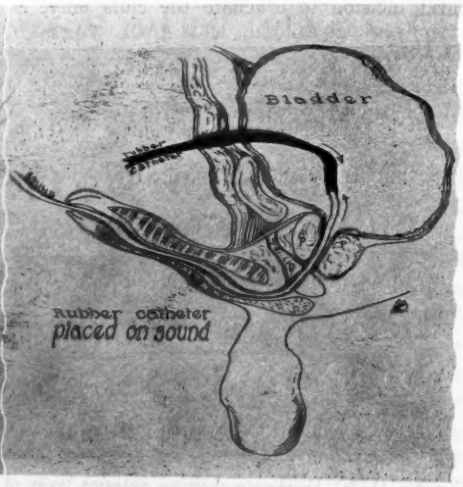

Fig. 4. (Right) Visualizing the method of placing an inlying urethral catheter following technic of Fig. 3.

symphsis and ischium may disturb the relationship of the two layers of the triangular ligament, which are about one centimeter apart at the point where they are perpendicularly penetrated by the urethra. With a pelvic fracture with displacement a greater shift in any direction of one layer of this ligament than its mate, obviously exerts pressure on the urethra at its point of entrance or exit. The degree of urethral trauma depends upon the pressure exerted by the edge of the foramen of one layer of the ligament. Clinically this urethral injury usually occurs where the urethra penetrates the posterior layer of the triangular ligament. Only in very several multiple fractures, with much displacement, does it occur also in front of the anterior layer. I have seen this combined injury but once. Anatomically a rupture between two layers is probable, but is never recognized clinically. No satisfactory explanation is at hand why the injury usually occurs at the point of entrance of the urethara into the posterior layer of the triangular ligament.

All degrees of trauma of the urethra occur here from a contusion to a complete separation of the prostatic from the membranous urethra.

With this combination of injuries shock is usually the first, most prominent feature. As this is successfully combated and the kidneys resume their function, bladder urinary retention becomes apparent either by the presence of a gradually distending bladder or by the distress of the patient being unable to void. Bleeding from the urethra may or may not be present. The urethral defect being posterior to the triangular ligament readily allows urine to escape into the surrounding tissues. Urine may be forced into these tissues involuntarily by abnormal intravesical pressure or voluntarily when the patient tries to void. As has been shown, the course of this extravasation of blood and urine is directed upward, at first being periprostatic, then perivesical, laterally and anteriorly and, if sufficient time has elapsed, continues upward, separating the transversalis fascia from the peritoneum. This advanced condition usually requires six or more hours to develop and presents a clinical picture not difficult to recognize with the experience of having seen a single case before. The contact of urine to peritoneum makes for abdominal protection rigidity which sometimes results in the diagnosis of intra-abdominal rupture of the bladder or the rupture of some intra-abdominal viscus. Such a rupture of the bladder could only occur if the bladder were distended at the time of the accident. Spicules of bone from fractures of the transverse rami of the symphysis are seen which result in extraperitoneal rupture of the bladder. This changes the clinical picture only by obliterating the diagnostic finding of a distended bladder.

Two recent cases, both pedestrians who were hit by automobiles and seen about six hours after the accidents, may present some features of diagnostic value. They had identical lesions and very similar clinical pictures. Both had separa-

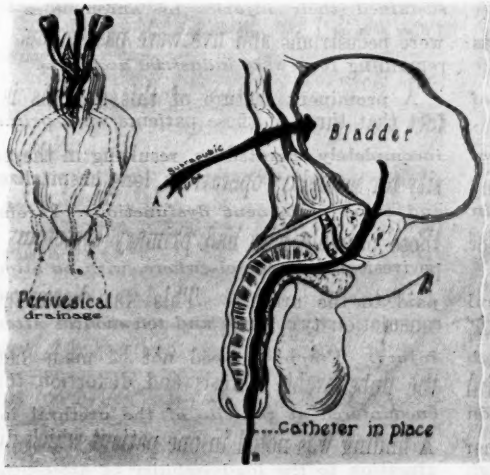

Fig. 5. (Left) Visualizing complete drainage applied. Note bilateral perivesical and periprostatic drainage.

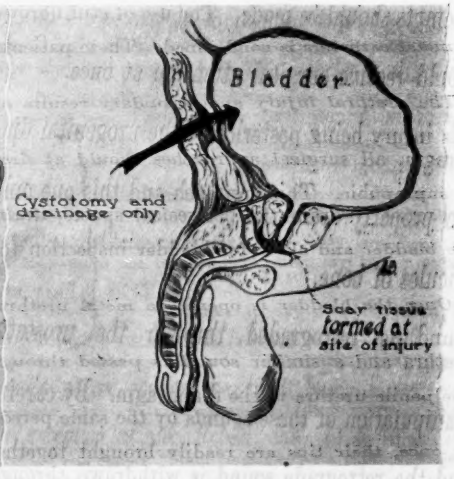

Fig. 6. (Right) Diagrammatic sketch to show urethral occlusion with organized scar following incomplete early urethral repair.

tion of the symphysis diagnosed by films and by palpation, with no other bone lesion. There was diffuse low abdominal pain and tenderness with rigidity. Neither had voided nor had any desire to do so. A catheter was readily passed to the bladder and a few ounces of bloody urine collected. Suprapubic incision revealed extraperitoneal rupture of the bladder anteriorly in each case. Undoubtedly these patients had distended bladders at the time of the accidents. Clinically they were typical pictures of ruptured posterior urethrae of six or more hours' duration, but without a palpable bladder. The ease with which a catheter could be passed to the bladder should indicate the probable diagnosis under these circumstances.

Contusions of the urethra without rupture may result in urinary retention because of local edema. A catheter can be passed without much difficulty and it should be left indwelling for a few days until the edema subsides. Paradoxically, there may be no apparent interference with urination and yet there be a definite small rupture of the urethra. This will become clinically apparent after some hours or even days when evidence of slow but progressive deep urinary extravasation presents itself.

Patients seen early after the accident who present some evidence of urethral damage but no finding of extravasation should at once have the advantage of an attempted catheterization. Should obstruction be met at the triangular ligament area with a soft rubber catheter, no further attempts should be made. The use of stiff fibrous or metal catheters is condemned. These patients should receive surgical attention at once.

The urethral injury and secondary results of this injury being posterior to the urogenital diaphragm, all surgical approaches should at first be suprapubic. This approach and this one only can properly drain the perivesical spaces, drain the bladder and allow for bladder inspection for spicules of bone.

Once the bladder is opened, a metal urethral sound is retrograded through the prostatic urethra and a similar sound is passed through the penile urethra to the diaphragm. By careful manipulation of these sounds by the same person at once, their tips are readily brought together and the retrograde sound is withdrawn through the bladder, leading the other one into the bladder. A catheter is then attached to the tip of the sound in the bladder and the sound withdrawn, bringing the catheter with it. This catheter is left indwelling to act principally as a splint for urethral repair. The sound which was passed through the entire urethra, besides being the means of placing the catheter, has produced a normal relationship of the two layers of the triangular ligaments and their foramen. The catheter placed is sufficient to hold this relationship. The perivesical and suprapubic bladder drains are removed before the inlying catheter, which should remain for at least ten days.

There are surgeons who recommend the perineal approach with end to end suture of the urethra, suggesting that it is more surgical and reduces stricture formation. The chief factor which should mitigate against this method, even by those with adequate surgical skill in perineal surgery, is the position of the patient necessary in performing it. This position, lithotomy, is prone to increase bone displacements with a great chance of increasing urethral damage.

Should perineal hematoma be present, this must be adequately drained and in my experience has been the only reason for a perineal incision in these conditions.

On examining the records of eighteen patients sustaining urethral injuries associated with fractured pelves there were four deaths or 22 per cent. mortality; one died of secondary hemorrhage 28 days following operation (probably an avoidable death) and three from associated skull fractures. Fourteen of the eighteen patients sustained their injuries by automobiles—nine were pedestrians and five were passengers. The remaining four were industrial accidents.

A prominent feature of this analysis is the fact that three of these patients were primarily incompletely operated on, resulting in the necessity for secondary operations, long hospitalization and some permanent dysfunction. I refer to those patients who had primary cystotomy and perivesical drainage elsewhere, with no attention paid to the urethra. This was discovered by consulation two, three and ten months after the injury. Emphasis need not be made here of the unbelievable fibrosis and distortion that is encountered at the site of the urethral injury. A finding was noted in one patient which directs attention to the inadvisability of attempting to pass stiff urethral catheters. This man was injured two days before consultation was requested.

His doctor thought he had placed a stiff French catheter into the bladder soon after the accident. The catheter drained unsatisfactorily and the patient was not doing well. Open operation revealed the end of the catheter in the space of Retzius.

Two patients were not operated on—one was moribund and soon died of skull fracture and the other was successfully managed by catheter (undoubtedly a contusion only).

Later management of these patients consists essentially of combating urinary tract infection and preventing urethral stricture. All urethral injuries in this connection, whether contusions or complete ruptures, must have systematic soundings for at least a year and occasional soundings indefinitely after that. Once a tight stricture has been allowed to develop the morbidity is greatly increased.

In conclusion I should like to repeat that, due to the physical nature of the urogenital diaphragm and its relation to the urethra, the course of extravasation is determined. Usually straddle injuries occur anterior to the diaphragm and the operation should be done perineally; urethral injuries with pelvic fracture occur posterior to the diaphragm and these require a suprapubic operation. Adequate and early surgical management in both types is stressed, as is absolute necessity of long follow-up treatment to control urethral stricture.

DISCUSSION

Dr. Leander W. Riba, Chicago: The opportunity to discuss Dr. Culver's paper is greatly appreciated by me. Dr. Culver was my teacher, and I do not know of anyone in Chicago who has had more experience and is better qualified to present this interesting paper to us. The anatomy, diagnosis and treatments have been so thoroughly covered that there is perhaps very little to add. There are several points which come to mind for particular consideration and discussion.

A great deal has been said and written about the use of intravenous pyelography following injuries of the urinary tract. While this would seem the ideal diagnostic procedure in practice, however, this is not always the case. Due to the large amount of abdominal gas or depressed renal function or both, accurate diagnostic definition is not always obtainable. In these unsatisfactory cases the retrograde method of investigation may now be more safely employed. For visualizing an injured urethra, a ruptured bladder or kidney, I would like to recommend the use of 20 to 25 per cent. skiodon solution. This solution provokes practically no extra-urinary tissue reaction. This slide represents perirenal extravasation of skiodon solution. Following this injection there was no fever, pain or renal dysfunction.

The management of traumatic urethral strictures has in many instances been extremely unsatisfactory. Many of these strictures are rebellious to repeated dilatation. During the past five years at Northwestern University Medical Clinic and at Passavant Memorial Hospital, we developed an electro-urethrotome which has been extremely helpful in the management of undilatable strictures. In more than 100 patients operated on we have greatly reduced the morbidity, there has been no mortality, and we believe there has been less tendency to immediate postoperative recontraction.

Superficial urinary extravasation may follow anterior urethral injuries. More often, however, this condition is associated with small caliber strictures. Some authorities prefer the term "cellulitis" rather than extravasation, because so frequently the bladder is overdistended with urine. Normal urine when injected experimentally into living tissue provokes very little local reaction. The overwhelming rapid toxicity in these patients is perhaps primarily due to the associated acute disseminating infection plus some extravasation of urine.

The present accepted urologic treatment of this serious condition is 1. obtain immediate urinary drainage either suprapubically or perineally, and 2. treat the acutely involved infected tissues by multiple extensive surgical incisions. The reported mortality following this regimen varies between 18 and 60%. By way of comparison, the accepted treatment of an acute disseminating infection, as based upon modern general surgical principles, is conservatism. Surgical incision is only resorted to if and when some localization of the process has occurred. While it is conceded that every case should be treated upon its own merits, it seems likely that if the immediate surgical interference were limited to the most simple procedure of obtaining adequate urinary drainage, our present shocking mortality could be materially reduced.

Because bleeding is so common following prostatic resections, Alcock and Foley have recommended a postoperative balloon catheter. This catheter is also useful in other conditions where permanent urethral drainage is indicated. The marked improvement in urinary drainage which has been brought about with this catheter is attested to by all who have used it. They are usually quite comfortable, allow free drainage from the anterior urethra and become dislodged only under very unusual circumstances. The only drawback regarding their use is economic; they are rather expensive, costing $3.50 each.

In closing, I would like to say a word about the proper suture material to be used in the surgical repair of the urinary bladder. In the light of our recent knowledge the routine use of all heavy catgut, particularly plain catgut, should be discouraged. With the exception of silk, Robert Bates of Northwestern recently has shown "plain catgut excites prompt, violent tissue reaction which delays the appearance of fibroblasts and so delays sound healing. Small chromic catgut, number 000, is associated with retarded and

lessened tissue reaction, early appearance of fibroblasts and early healing. Wound support and healing are most satisfactory when the smallest chromic sutures are employed." Recently a friend of mine from the east, commenting on a bladder operation he had seen, stated "I don't see how that bladder can ever heal with the yards of heavy catgut which were used during the operation."

Dr. V. D. Lespinasse, Chicago: There are several points I would like to mention in connection with this particular type of injury. First, to call attention to one fact that is peculiar to this type of injury. Why should trauma to the perineum cause serious trouble? Because the urethra is cut off, and in addition to just ordinary treatment of contusions some arrangement must be made for the disposal of urine. Urine in itself is a very dangerous substance to tissue, especially when mixed with infection. So the primary care is very simple—cut. Wherever there are swellings in the perineum, cut and let it go at that. The urine will drain out through these openings. The same method applies for injuries about the triangular ligament. This is the primary method of handling this type of injury.

After the emergency is passed and the shock is recovered from, then you need to do something to reestablish the urethra. As Dr. Culver showed you, with sounds, getting that urethra lined up as soon as you can. This is usually easier from above than from below. There is one point, in trying to find the urethral ends, if you are in the perineum; all the structures are traumatized and hemorrhagic and you cannot always identify the anatomical parts. There is an old procedure named after an Irish surgeon. To carry this out you put your finger in the rectum, locate the tip of the prostate and then take a knife and stab through the perineum, just missing the end of your finger, and you will be in the urethra.

A type of injury Dr. Culver did not mention is injury to the anterior urethra. I have had three instances of it, that is, injury of the anterior urethra from compression between some object and the symphysis. When the penis is caught between the symphysis and a plank, or some object, it gets crushed, and rest assured this is a very serious injury. It is one that is not of very common occurrence, it is true, but sometimes it occurs, and there is a question with injuries of that sort as to the advisability of amputating the distal end of the penis.

Dr. Sumner L. Koch, Chicago: I am sorry that Dr. Lespinasse did not emphasize that the incisions made in the perineum to permit the escape of extravasated urine must be dressed with aseptic care so that no infection can be added from without. Since he comes from Northwestern he should have stressed that principle.

Dr. Harry Culver, Chicago (closing): I wish to thank the gentlemen for the liberal discussion. I would like to say one thing about the Cox procedure. I am wondering what he would do if he were not able to judge the distance so accurately as to just miss the finger. I have been afraid to try it because the triangular ligament must be pierced and the possibilities of incising the external sphincter are much too great. I have seen this complication result. The dangers are too serious to ever make such a procedure a practical one.

THE PREMATURE INFANT—EARLY GENERAL AND FEEDING CARE

JULIUS H. HESS, M. D.
CHICAGO

At the Annual Meeting of the American Academy of Pediatrics held in New York City on May 19, 1935, the following resolution was passed in an attempt to define prematurity:

"For statistical purposes and comparison of results of care, a uniform standard for diagnosis of prematurity is important.

"A premature infant is one who weighs 2,500 gm. or less at birth (not at admission) regardless of the period of gestation.

"All liveborn premature infants should be included, evidence of life being heart beating or breathing."

Therefore, premature infants may be classified for practical clinical purposes to include any infant, whether a single or multiple birth, born prematurely, at term or even past term, whose weight at birth is below 2,500 grams (5½ pounds). The inference is that the infant is not completely prepared for full, normal, independent extra-uterine life. There may be, however, ony a relative body weakness in the absence of inherited constitutional debility and malformations. Full consideration must be given in the case of each individual infant to the precipitating causes in the parents and the infant, as well, which might have led to premature delivery or pathological intra-uterine development.

It is well known that the younger and smaller the fetus when leaving the uterus the greater are the difficulties to be overcome in carrying out required body functions necessary to life and, therefore, the consequent lower vitality.

A second resolution passed at the same meeting of the American Academy of Pediatrics Meeting expressed the desirability of registering mortality in the following manner:

"1. In weight groups: number of cases should be studied in five weight groups—

Read before the Conference on Diseases of Children at meeting of Illinois State Medical Society, May 17, 1938, at Springfield.

(1) Under 1,000 gm.
(2) 1,000-1,250 gm.
(3) 1,251-1,500 gm.
(4) 1,501-2,000 gm.
(5) 2,001-2,500 gm.

"2. Age at time of death of various weight groups.

"3. Age at time of admission of infants received from other hospitals and homes."

Benefit to the Infant of a Prolonged Gestation: Clifford has estimated the expected intra-uterine weight gains to be:

	Gain per week
Fifth lunar month	120-150 gm.
Seventh lunar month	180-240 gm.
Ninth lunar month	300-360 gm.

The value of continuing intra-uterine life as long as possible is well evidenced by the mortality rate based on weights taken from the records at the Sarah Morris Station.

Mortality Rates Based on Weight

	Survival
Under 1,000 gm.	15.5 percent
1,000-1,500 gm.	43.3 percent
1,500-2,000 gm.	75.2 percent
2,000-2,500 gm.	87.2 percent

It can be easily realized, therefore, that two to four weeks of prolonged intra-uterine life is of great importance in reducing the mortality. It is also to be remembered that the younger the fetus the graver the danger of intracranial hemorrhage.

Obstetrical Analgesia: Any analgesic given to the mother affects the baby to some degree. Irving in a study of 500 consecutive deliveries where no anesthesia was used, found only 10 per cent. of the babies required resuscitation. In a series receiving scopolamine-morphine he found 60 per cent. had to be resuscitated, and in a group in which phenobarbital was administered 40 per cent required resuscitation. These figures refer to a study of deliveries of full term infants. One can easily realize the increasing danger from various analgesics given in excess to the mother in the case of the prematurely born infant.

Immediately after respiration has been initiated in the infant suffering with extreme narcosis, oxygen or oxygen-CO_2 therapy should be instituted.

Provision for the Premature Delivery: In case of expected premature labor immediate preparation should be made for the reception of the infant into a proper environment. The preparation should not be delayed until labor has begun, otherwise many viable premature infants will be lost. If the proper facilities cannot be furnished in the home the mother should be persuaded to enter a hospital before confinement.

Preparation for the proper conduct of labor should be complete, whether in the home or hospital. The mother should be prepared with great care and every effort made to conduct an aseptic labor. The room should be selected and equipped to meet the needs for labor and the requirements of the infant. It should be well ventilated and properly heated to at least 70 degrees F.

Avoidance of mechanical trauma incident to delivery, chilling of the infant, and exposure to infection are important factors in reducing mortality.

Initial Care: A warm sterile pad, towel, or preferably a blanket should be in readiness to receive the infant. As soon as the head is born the face and eyelids should be gently sponged with sterile gauze and the mucus should be removed from the air passages by carefully wiping with sterile gauze. Upon delivery of the body the infant and the cord should be protected from contact with feces and other foreign matter. The infant should be placed so that the head is dependent, allowing the mucus and secretions, which may have accumulated in the respiratory passages, to escape.

Tying and Section of the Cord: The time elapsing between the birth of the infant and the tying of the cord will depend on the general condition of the infant and to some extent on the obstetrician's ability to prevent chilling of the infant. In the absence of marked asphyxia it is well to allow the pulsation of the cord to become weakened or to disappear before ligation. This usually requires from one to five minutes, during which time the infant will receive from 30 to 60 cc. of blood from the placenta. This blood should be conserved when possible without risk.

The cord should not be tied too closely to the skin. Great care must be exercised in tying the cord to prevent severing it with the ligature which is easily accomplished in the premature. The cord should be sufficiently long to allow for a second ligature.

The possibility of asphyxiation of the premature infant must be borne in mind throughout

the entire labor. Any accumulation of secretions or aspirated material should be removed by inverting the child and gently wiping the mucus from the throat or by aspiration by means of a catheter. In the more extreme degrees of asphyxia a warm bath and the institution of artificial respiration by regular and gentle compression of the chest followed by the administration of oxygen may be necessary. Swinging and other forceful methods of inducing artificial respiration must never be practiced.

The irritation of the catheter in the pharynx will frequently reflexly stimulate respiration. If the infant appears to be recovering spontaneously it should be left alone.

Administration of oxygen, about 120 bubbles per minute, may be of value if administered through a catheter inserted in the nose or mouth, or through a properly constructed mask. If an oxygen chamber is available the child should be placed in an oxygen air mixture of 40—50 per cent. oxygen.

All premature infants, whether or not showing signs of asphyxiation at birth, should be carefully watched for cyanotic attacks during the first days of life, as such attacks may develop suddenly and without warning. They may be due to a defective pulmonary circulation, a congenital atelectasis, or intracranial hemorrhage. At other times they are precipitated by intra-abdominal distention interfering with cardiac or respiratory action. Oxygen therapy offers the best single method of resuscitation.

Neonatal Initial Care—Care of Mouth and Nose: Every effort must be made to avoid trauma of the mucous membranes of the nose and mouth because of the danger of secondary infections. Much can be accomplished by placing the child with the mouth downward or laterally with trunk elevated for a few hours, so that the mucus can gravitate toward the nose and mouth.

Care of Eyes: One per cent. silver nitrate solution or 25 per cent. argyrol should be used to prevent ophthalmia neonatorum. The nitrate of silver solution should be neutralized with a normal saline solution. Not infrequently the application of silver nitrate will result in some inflammatory reaction of the conjunctiva in the first 6 to 12 hours after its application. This is especially frequent in premature infants and is relieved by cold applications. This is not to be confused with the more serious specific ophthalmia which may develop on the second or third day. In all cases of doubt a microscopic examination of the purulent discharge must be made. An old silver nitrate solution which has undergone decomposition should be avoided, as such solutions are far more prone to irritate the sensitive conjunctiva.

Care of Skin and Genitalia: It is of the greatest importance that premature infants shall be handled as little as possible. At Cook County Hospital during the past year we have not bathed or oiled the infants during their first week, having adopted the plan introduced by Sanford of allowing the vernix caseosa to remain on the infant, simply wiping the region of the eyes and buttocks with sterile water. Since the introduction of this plan there has been a minimum evidence of skin irritation and no cases of impetigo. Others may prefer a mineral oil cleansing, or, in case of larger infants, a soap and water sponging.

Daily Routine: The body temperature must be taken through the rectum and should be recorded morning and evening. An individual thermometer should be furnished for each infant. Undue exposure and trauma should be avoided from the moment of birth. Fluctuations in body temperature are more marked than in the full-term infant, with a tendency toward hypothermia. A minimum of 96 degrees F. should be considered the lowest compatible with progress. Attempts should be made to limit the daily fluctuations to 1½ degrees F.

The temperature of the heated bed should be varied with the needs of the individual infant. Small prematures and congenital weaklings with marked hypothermia should temporarily have a surrounding temperature varying, from 85 degrees F. to 95 degrees F. Older and stronger infants are better placed in a bed at 80 degrees to 85 degrees F. As the infant develops its vital functions and the subcutaneous fat increases, the temperature of the bed should be gradually lowered to that of the nursery, which should be kept at about 75 degrees F.

Removal from the bed should follow definite indications. Changing napkins and the ordinary routine measures can be carried out in the bed.

The body must be insulated by proper clothing which will be described.

The body fluids, after the first few days, must

be maintained by an intake of from one-eighth to one-sixth of the body weight in fluids in 24 hours, and this must include a caloric intake of more than a sustaining diet, 70 calories per kg. after the first few days of life.

Respiratory and circulatory functions must be protected and at times stimulated.

Hyperpyrexia frequently results from an overheating of the bed, and when a high temperature is noted the temperature of the bed should be considered as a possible cause.

Infections of all kinds tend to the development of fever, but, on the whole, the reaction is less than in the full-term; however, the exception may be true. Massive pneumonias have been found at autopsy which were unassociated with temperature above the average normal.

Weighing should be done with a balance scale at a specified time each day as part of the general routine. The infant should, unless contraindications exist, be undressed for the purpose, and weighing is best done before the bath.

Those fed at the breast must be weighed before and after nursing, and the food taken should be recorded.

Loss of body-weight during the first days of life occurs almost constantly in premature infants, the percentage loss being greater in the premature than in the full-term infant, and on the whole, they are much slover in regaining their birth weight.

Most infants regain their birth weight by the eighteenth to the twenty-first day, with a daily gain averaging from 10 to 30 gm. (⅓ to 1 oz.) after reaching their lowest weight, which is usually about the fifth day. Infants under 1500 grams may be considered as growing satisfactorily on an average daily increase of from 10 to 20 grams (⅓ to ⅔ ounce). They will often double their birth weight in 75 to 90 days. Those from 1500 to 2000 grams usually double their birth weight in from 60 to 75 days.

Infant's Clothes: The wardrobe should be planned and completed in advance of labor. In emergencies this may not be possible. It is imperative to remember that preservation of body heat must be begun immediately after birth on the confinement bed itself.

Temporary Clothes: At birth the infant is received into a warm blanket and immediately placed in a heated basket or heated bed.

In supplying external heat it should be remembered that these infants are easily burned, and such burns are usually fatal.

In small prematures for temporary emergency, a sterile cotton-pack which completely envelops the infant, except for the face, may be applied. It should, however, be remembered that cotton is far inferior to wool in prevention of heat radiation. An improvised jacket, preferably of flannel, may be placed on the outside of the cotton to hold it in place.

To the cord, genital regions and anus, an easily changed pad of cotton or gauze combination may be applied. Whenever the infant becomes soiled, it is necessary to change the pad. This should not be neglected.

Permanent Clothes: In a well-equipped station several sets of special clothes should be provided. These should be kept sterilized in packets.

With the open type of heated beds, all garments next to the body, except the napkins, should be made of light-weight flannel.

Care in the Home: The establishment and maintenance of properly equipped hospital stations are essential to the lowering of mortality, more especially in the larger cities and particularly among the proper classes. A careful consideration of the requirements for the results to be expected from their care in the home is equally essential and good results can be obtained.

In the care of these infants at home the same rules for asceptic nursing, maintenance of body temperature, breast feeding and daily routine must be maintained, as suggested for hospital care.

When a bathroom is available only one other room need be supplied.

While the baby is being dressed or bathed the nursery or bathroom temperature should be in the neighborhood of 80 degrees F. A gas or electric stove will be of assistance in accomplishing this. When a heated bed is in use the sleeping room may be kept between 70 degrees and 80 degrees F., varying with the indications for the individual infant. It should be clearly understood that all visitors other than the attendants and physician must be excluded. Gowns and masks safeguard against infection.

Hospital Nursery Units: Special equipment is necessary, whether they are to be cared for in

the obstetrical or children's divisions of a general hospital. The lack of proper arrangement for their care in general hospitals throughout the country represents a striking lack of foresight.

The equipment to be recommended is to a large extent dependent upon the method which is to be used for maintaining the body temperature of the individual infant.

1. Special nursery units in which ventilation, temperature and humidity are automatically regulated.

2. Ordinary hospital nurseries in obstetrical or pediatric departments in which the room temperature is fairly constant but which are without special means of ventilation and humidity control.

In wards of the second type individually heated beds must be supplied for the infants. They are also necessary for a limited number of the infants cared for in wards of the first type, as the smaller and more frail infants require a higher surrounding temperature than the larger and more matures ones. A combination of the superheated, regulated room with special beds for the exceptional infants is a combination to be desired.

Only a limited number of institutions have as yet air-conditioned units so constructed as to meet the requirements of these small infants for the preservation of their body temperature, to maintain an optimum humidity and to provide a constant and definite change of air. The construction of such a series of rooms to meet the requirements for normal and infected infants requires a considerable expenditure. The Boston and Yale Children's Hospitals have such rooms in successful operation.

Many new units for air-conditioning are being introduced which, however, vary greatly in their efficiency. It is to be remembered that maintaining and controlling temperature and humidity during the different seasons of the year offers a most serious obstacle to popularizing automatic control. This applies more especially to the summer months.

Blackfan and Yaglou believe that the humidity best suited for stabilizing the body temperature of premature infants should approximate 65%, with a room temperature of 75 degrees to 80 degrees F. In the Sarah Morris Hospital, where no attempt is made to automatically regulate humidity, it varies more often between 40 and 55%. During the winter months, more especially, it is at times necessary to raise the humidity and this is accomplished by moistening sheets which are hung on ordinary ward screens. When the humidity is too high nurses not infrequently complain of personal discomfort.

Equipment of the Station: It has been our desire to demonstrate that the care of premature infants can be accomplished in a practical manner in any well-organized obstetrical department or children's hospital. A station should provide at least one or more rooms and as far as possible the following equipment:

Individually heated beds for small infants.
Bassinets for graduates.
Oxygen therapy units.
Heated dressing table.
Sink with bathing slab.
Shelves for toilet articles.
Supply closet.
Scale.
High and low temperature registering thermometer.
Hygrometer, wet and dry bulb type.
Time clock, for recording time for feedings.
Electric heater for emergencies.
Screens.
Electric refrigerator.
Transportation ambulance for prematures.
Heated beds for home use (loaned to graduates for temporary use).
Ultra violet-ray lamp.
Electric breast pump.

Nursing Staff: The selection of a personnel for the nursing staff of a unit established for the care of premature infants requires great care. Nurses assuming these responsibilities must be intensely interested in their work. They must be willing to make many necessary sacrifices while the infant is passing through the critical stages. They must, at all times, be prepared to meet the emergencies of asphyxia and to counteract the spells of cyanosis. These two factors in themselves require almost constant vigilance, otherwise, the work of previous days will go unrewarded. They must use good judgment to prevent over and underfeeding, as to a very large extent the size of the individual meal will be governed by the physicial condition of the infant at the time of feeding. In no other class of patients is it so necessary to change or modify on short notice previous orders for diet. The nurse must know the indications for and the methods of administering catheter feeding, colonic flushing,

tubbing, and the application of artificial respiration.

In hospital words the constant changing of nurses, as is so frequently the case in meeting the curriculum for nurses' training in general hospitals, is found to be a great disadvantage. Better results are obtained when the nurse in charge has under her care assistants who need not necessarily be nurses in training, but preferably young women who are especially preparing themselves for the care of young infants, and who can be relied upon to stay in the station for long periods of time. Such women become expert in the handling of these infants, can frequently feed them with a minimum excitement of their pharyngeal reflexes, and soon learn to bathe and give them their exercise and massage, which is so essential to every infant in order to prevent "hospitalization."

The ideal nursing staff for such a station is, therefore, one consisting of a well-trained supervising nurse and a corps of assistants desiring this training, and who are willing to remain in this service for a long period of time, together with a limited number of nurses in training.

Clinical Records: A careful history is most important as much evidence which will have a direct bearing on the prognosis will frequently be elicited, as well as suggestions for feeding and therapy. The maternal history as to illness, previous pregnancies and their outcome must be elicited. The paternal history is also of prime importance. The presence or absence of acute illness in the home, more especially whooping cough, scarlet fever, diphtheria and septic infections should be investigated before the infant is discharged.

Home Instruction—Social Service: Every hospital record should show the data of at least two social service investigations. This, while usually neglected, frequently reveals conditions in the home which make the early discharge of these infants impossible if their lives are to be conserved.

The first investigation should be made in the shortest possible time after the infant enters the hospital and the last just previous to the infant's discharge.

A nurse should visit the mother usually within the first twenty-four hours after the infant is received and instruct her in the care and expression of her breasts so as to encourage her in maintaining her in maintaining a supply of breast milk. Regular four-hour expression is advised, the mother being supplied with sterile bottles so that she may send or bring her milk to the station. This stimulates the milk supply and encourages the mother in her effort to produce milk for the future use of the infant. As soon as the mother's physical condition permits she should be requested to come to the station at stated times to receive instruction in the care of her small infant, and to nurse it directly at the breast if its development warrants it. This is a valuable educational feature insofar as the infant is concerned.

Before the infant is discharged from the station the nurse visits the home and instructs the mother in the necessary preparation for the infant's return.

Following the discharge from the hospital the nurse should visit the home one or more times weekly, as may be indicated.

Wet Nurses. The wet nurses express their breasts at regular four-hour intervals, five times a day, with an electrically-driven pump, or by hand expression. If there is any doubt as to the quality of the breast milk it is boiled for one minute.

It is my belief that it is a great advantage to be able to feed raw breast milk. This is not difficult to accomplish in the home or in the hospital where the mother has an ample supply of breast milk or where it can be obtained from available wet nurses. Where the source of breast milk is open to question it must be boiled. A freezing process similar to that used for holding ice cream is now available for this purpose. Freezing with dry ice results in minimum changes in the milk constituents. The small disc process which has been introduced in New York and is the one here alluded to, is not practical as now used where such large quantities of milk are required as in the case of Sarah Morris and Cook County Hospitals. For this reason we attempt to collect a milk as near sterile as possible.

In order to produce a maternal milk with as low a bacterial count as possible the wet nurse removes her outer clothing and dons a cap and mask, putting on a short rubber apron below the breasts. She then scrubs her hands and nails and a nurse cleanses her breasts with soap and water, after which the wet nurse cleanses her

own breasts with boric solution. When this is done she is assisted by the nurse in putting on a sterile gown with separate breast curtains. She then goes into the milk collecting room where her milk is collected in a sterile graduate and from this poured into graduated nursing bottles. The bottles are labeled and the milk is iced immediately. When larger quantities are to be preserved, the milk is poured into Mason fruit jars for fractional sterilization.

Diet of Nursing Mothers and Wet Nurses. Although the diet of a nursing mother of a full-term infant may, in many instances, be unrestricted, it is not so with the mother of the premature or the wet nurse who may be supplying the breast milk. The following articles of food should be excluded from the diet of the wet nurses: highly spiced or seasoned foods; fried foods; also cabbage, turnips, cauliflower, onions and sauerkraut. The following fruits are recommended: oranges, bananas and stewed fruits. Constipation should be relieved by diet, mineral oil, or enemas.

Gastric Capacity. In a postmortem study of 34 stomachs under pressure of a column of 15 cc. of water, the average size fetal stomachs was estimated as follows:

24 weeks..... 5 c.c.	32 weeks.....18 c.c.
35 weeks..... 8 c.c.	36 weeks.....25 c.c.
28 weeks.....10 c.c.	40 weeks.....45 c.c.

The stomach of the premature infant on a diet of breast milk is usually found empty at the end of one and a half to two hours. That of the artificially fed requires a considerably longer period of time, depending upon the nature of the food administered, even in the case of feeding with predigested milk.

Feeding Schedule. Human milk is the food of choice for the premature infant and this applies more especially to small infants.

A regular feeding schedule must be instituted. The feedings of necessity vary as to number and size as well as to the quality of milk mixture.

The following is recommended:

First 12 hours after birth: No water or milk is given.

Second 12 hours after birth: The following schedule can be instituted for most infants. The quantity may vary with the age and development of the infant:

13th hour	Boiled	water	2-6 c.c.
16th hour	Boiled	water	2-6 c.c.
18th hour	Breast	milk	2-6 c.c.
20th hour	Boiled	water	2-10 c.c.
22nd hour	Breast	milk	2-10 c.c.
24th hour	Boiled	water	2-10 c.c.

Infants received several days after birth, which is true of many cases, must, of necessity, be fed according to their condition when received at the station. The first few feedings should be minimum. Dehydration is often marked and demands special consideration.

Feeding from Second to Twentieth Day. For practical purposes, the second to the twentieth days may be grouped together as the second feeding period.

From the second day the infants should be fed regularly day and night, the number and times of feedings depending to a great extent on whether the food is given with or without the use of a catheter, on the gastric capacity, and on the infant's general condition. Practically all infants after the second day receive eight feedings daily.

Beginning (in most cases by the second day) with from 20 to 40 c.c. of human milk per kilogram (⅓ to ⅔ ounces per pound) of body weight, the quantity may be increased from 8 to 15 c.c. daily per kilogram (⅛ to ¼ ounces per pound) until, usually by the twentieth day, feedings averaging from 135 to 150 c.c. per kilogram (2 to 2½ ounces per pound) can be given.

TABLE I

BREAST MILK SCHEDULE FOR PREMATURE INFANTS

Day	2nd	3rd	6th	10th	20th
Per cent of Weight	1/50	1/40	1/20	1/10	1/6
CC. per Kilo	20	25	50	100	180
Calories per Kilo	13	16	33	66	120
Ounces per Pound	⅛	⅜	¾	1½	2⅝
Calories per Pound	6	8	15	30	50

Small *increases* should be made daily if well taken.
Most infants can approximate these amounts.

TABLE II

BREAST MILK FEEDINGS DAILY

Weight of Infants	1500-gms. or less	1500-2000 gms.	2000-2500 gms.
Second Day	20 cc.	30 cc.	40 cc.
Daily Increase	8 to 12 cc.	12 to 16 cc.	16 to 20 cc.

During the first days, further fluids, such as boiled water or one-half strength Ringer's solution are administered to compensate for the loss of body fluids through the kidneys, bowels, lungs and skin. The infant requires about one-sixth of its body weight of water, inclusive of

that contained in the milk, in 24 hours while in the heated bed. Such quantities, however, should not be attempted on the first days; usually it will be possible to approximate one-eighth of the body weight in total fluids by the fourth day. The early feedings must necessarily be small and the increased feedings given gradually. The infants must be considered individually, as it is impossible to formulate definite rules for feeding, at least during the first ten days.

Increases in food are based on the weight of the infant and the infant's food tolerance. The smaller and the more premature the infant the more slowly the feedings are increased. For any premature under 1000 grams the amount is never increased more than 1 c.c. at a time. Irrespective of the size of the premature, it is always started on a very small quantity and increased gradually, never over 3 c.c. at a feeding.

Overfeeding, either through too rapid administration, too large individual feedings, or too rapid increase in the day's food, should be as conscientiously avoided as underfeeding.

It is necessary to supplement the feedings by giving water or one-half strength Ringer's solution between feedings until the milk feedings total one-sixth of the body weight per day. In the presence of persistent vomiting it will be necessary to resort to subcutaneous administration of fluids.

Human and Lactic Acid Milk Mixtures. To increase the protein content of the diet skimmed lactic acid milk (buttermilk) is added to the feedings of many infants in proportions of one part skimmed lactic acid milk to three parts breast milk. The lactic acid milk used is prepared by the addition of a lactic acid bacillus culture to sterilized skim milk. Powdered skimmed lactic acid milk to three parts breast milk is well taken by older infants showing stationary weight. Whole lactic acid milk, cultured or powdered, may later be used to replace the fat-free lactic acid milk.

The diet of the premature infant making a satisfactory gain should not be changed arbitrarily without a well-defined indication.

After the twentieth day the food requirements of the infant are well established. A careful observation of the weight, stools, disposition and, what is equally important, its body temperature, will determine the future food requirements. The fluid requirement (milk and water) will, to a great extent, be governed by the temperature and humidity in the bed and room.

As the infant takes on weight and becomes fat, with a rounding of the features and the body, the total amount of the milk administered can be held at one-sixth, and, not infrequently, one-seventh of the body weight, and a normal increase in weight can still be maintained.

Artificial Feeding. Human milk is the natural food for the premature infant, for no other food can be fed to the same advantage. This is especially true of infants with a weight below 1500 grams.

All cow's milk mixtures ordered for the infant should meet the following requirements:

1. If fresh milk is used it should have been boiled for five minutes.
2. The mixture should have a low fat content.
3. It should precipitate with a fine curd.
4. Added carbohydrates should be increased more or less gradually from two to six per cent.

Many varieties of artificial diets have been suggested by different clinicians, such as simple milk dilutions, skimmed, evaporated, condensed, dried, rennet or reconstructed (similac, olac) and lactic acid milk preparations. To these mixtures carbohydrates are added. The results with these different milks are to a great degree dependent upon the physician's intimate knowledge and directions for the use of the individual food.

It should be remembered that the figures quoted for the feeding on breast milk are the maximum that can be assimilated and they may be excessive quantities for artificial feeding in the first weeks of life. When artificially fed these infants must at all times be closely watched for evidence of overfeeding, and the first evidence of digestive disturbances or of intercurrent infections should be taken as an indication for the feeding of human milk, whenever possible.

From the foregoing statement it is evident that slower increases in weight may be expected of the artificially fed.

Rennet Milk is prepared as follows: Whole cow's milk is boiled for five minutes, then cooled to between 104 degrees F. and 108 degrees F. It should be tested for temperature with a dairy thermometer. One rennet tablet (softened in a tablespoonful of cool, boiled water) or one

level teaspoonful of chymogen (Armour Co.) should be added for each pint of cow's milk used. The milk is then gently stirred for one minute.

The milk should be allowed to stand until it is well clabbered which takes from five to ten minutes. Then it should be beaten well with an egg beater which has been sterilized, until the milk is divided finely enough so that it will pass easily through the holes in the nipple. If it is not well beaten the milk will be lumpy. If boiled water is added to the milk it must be cooled before it is added otherwise large curds will form. The sugar may be added to the water used to dilute the milk. If the milk is not to be diluted then add the sugar directly to the milk. It may be necessary to enlarge the holes in the nipple moderately. Clumping will result if the milk is overheated at the time of feeding. Rennet milk has been the food of choice for many of our infants when breast milk was not available at the time of graduation from the station.

Lactic Acid Milk may be made from whole or skimmed milk as indicated. If cultured it is prepared by adding lactic acid bacilli to pasteurized or boiled whole or skimmed milk.

Powdered lactic acid milk is prepared by mixing one level tablespoonful of powdered whole or skim lactic milk with each two ounces of cooled boiled water. It is to be beaten with an egg beater to insure a smooth mixture. Carbohydrates are to be added in amounts as ordered.

Prophylactic Foods and Therapy. To counteract the loss of Vitamin C in milk through boiling, the feeding of orange juice should be instituted by the third week. Beginning with five drops daily the amount should be gradually increased to one or two tablespoonfuls, twice daily, by the end of the eighth week.

Cod liver oil, as an antirachitic, should be started by the end of the third week, beginning with two drops daily, and increasing to sixty drops daily by the eighth week. It is best divided in two feedings. Halibut liver oil and viosterol or the newer fish oil concentrates can be used, starting with two drops daily and increasing to 10 or 15 drops daily by the eighth week.

To meet the iron requirements of these infants raw egg yolk is added to the diet of both breast and artificially fed infants in the amount of one yolk to each quart of milk. One grain (0.06 Gm.) daily of carbonate of iron or iron and ammonium citrate may be used. Liver in combination with iron is a good preparation. Each level teaspoonful of the Lilly's formula contain approximately 3.75 Gm. (58 grains) of liver fraction, and 0.65 gm. (10 grains) of ferrous ammonium citrate. The initial amount should be ¼ Gm. (4 grains) daily, and increased up to 4 Gm. (1 dram) daily in older infants. Either the egg yolk, iron, or liver preparations should be introduced into the diet by the fourth week.

As early as the third week our infants are exposed to ultraviolet rays by use of a quartz lamp. The time of exposure varies with the indications in the individual case. At first these exposures should be limited to 15 seconds, and it is rarely necessary to give more than two-minute exposures three times a week. Over-exposure may result in irritability, vomiting, and increased body temperature. The exposure also varies with the amount of cod liver oil or other antirachitic oils prescribed.

DISCUSSION

Dr. S. C. Henn, Chicago: It seems to me that the care of prematures has been adequately covered. The thing that pleased me most has been the use of oxygen.

Dr. Krauss asked Dr. Hess one question and I have one idea. I wonder if the reason they get flat heads is because of the turning of the baby toward the light.

Dr. J. P. *Coughlin, Chicago*: Dr. Hess enumerated nine methods of resuscitation. I have often seen these nine and more tried in fifteen to twenty minutes. Yearly I have had an opportunity to see about 100 newborn babies within the first few hours of life and I feel that one of the greatest causes of failure is hurry to do something or do a lot of things right away. I have been impressed by the fact that few interns realize the importance of carefully clearing out the air passages.

There is another interesting thing. Dr. Hess wonders why the birth rate has decreased from 19 to 14 per 1000. Twenty years ago they were not interested in birth control, or if they were they were very surreptitious about it. I think the fact that this large group of people is studying rhythm explains why our birth rate has dropped off. These people were very prolific and they did limit their families as they do now.

Dr. M. L. Blatt, Chicago: Nothing so clearly shows the necessity for teamwork as the work that Dr. Hess has done with premature infants. It takes leadership, and in Chicago Dr. Hess's influence on the care of prematures has been outstanding. Those of us who have had anything to contribute have contributed as a part of his team. There are a few minor variants from what he has done and I should like to mention

them to you. They agree in general with most of his precepts.

I think it is important to recognize that an infant under five pounds in weight is a small baby. It is physiologically less adequate than the mature infant. As Dr. Parmelee has said, the alveoli are not well formed and the liver function is deficient. Dr. Hess has shown you that the cardia is wide and the pylorus narrow.

Prior to Sanford's demonstration of the possibility of not cleansing the newborn baby we used to clean our prematures. We have not done this for a long time and thereby avoid reduction in skin temperatures. These babies cannot generate heat well. I do not believe Dr. Hess stressed the fact that we do not put much clothing on the babies, but instead place covering on the outside of the incubator. The infants are in a shirt and a diaper; the blanket is outside the incubator. I remember when I was taught the care of the premature they were wrapped in cotton and then practically buried in covers.

The ease with which a premature may be exposed and its attendant dangers are well recognized. Overheating may just as easily occur. Recently we acquired a few new heated beds and once I found a 50 watt light in every bed when they should have had a 25 watt. You cannot overheat these infants without doing harm.

Another thing that is important is the primary need of the cells for oxygen before they can be stimulated by carbon dioxide. On that account we believe we do better with oxygen alone than with carbon dioxide which I know many of you are using.

We have not given additional iron to prematures for four years. Instead we give whole blood in the buttock every other day. We believe that by doing that we give an adequate amount of iron and in addition we increase their immunity to the upper respiratory infections to which they are so prone. We are using in preference to mother's or father's blood, the pooled blood of pregnant women. We believe that this blood contains certain endocrine factors which are of value to the premature infant. This we have not as yet proved.

We still prefer hand pumped, unboiled breast milk for these infants. There are two reasons why we prefer raw human milk: First, because the proteins and carbohydrates are those natural to the child, and second, there exists in human milk certain bacteria which are advantageous in the digestive tract of newborn infants. Hand expressed milk has a much lower bacterial count than that obtained with a breast pump because with a pump the expressed milk contacts a large area of skin. With hand expression the milk is expressed directly into a cooled vessel. At the County Hospital we are collecting enough breast milk so that every newborn infant gets a feeding of breast milk the first two days of life. In this way we are implanting in each gastrointestinal tract the organisms that are normally found in the breast fed infant. If they are not to be breast fed they are then put on artificial feedings.

Dr. Julius H. Hess, Chicago (closing): As to the question of flat heads, many are due to intra-uterine positions of the infant. Others are caused or aggravated by postnatal posture. These heads are soft; the membranous portion of the skull is in excess as compared to the osseous. The infant's position should be changed at regular intervals.

As to the question of resuscitation, I do not want to repeat but I am in agreement with everything that has been said. The greatest danger is in doing too much. That applies not only to resuscitation but to spinal puncture as well. We had a resident who spent a year in our department, spending much time in a study of the results in spinal punctures on prematures. He found that in the average premature, using a small (25 gauge) needle and with the baby held in a sitting position, he could get from one to three c.c. of spinal fluid. If there is a hemorrhage in the brain, removing this amount of spinal fluid will not relieve the pressure very much, and as a diagnostic procedure it is not reliable. If the hemorrhage is low down in the base you may get blood, but if it is higher up you may get clear fluid or nearly so. A few red cells in the spinal fluid we considered as physiologic. Some capillaries usually rupture as a result of the change in pressure which comes from the release of the infant's head as it leaves the pelvic canal, also from pressure while still in the canal.

I do not want to leave the impression that all prematures should be treated in a hospital. I do not believe our results are better than those in the home where there is provision for good care. The doctor really does not have much to do with their care. They require proper food, good nursing care and much good judgment. The babies we receive are largely those who cannot stay at home.

The recent epidemic at St. Elizabeth's Hospital has indeed resulted in something that is going to be beneficial to the people of Chicago. Some of those regulations are very strict but if they are administered with good judgment it will reflect to the advantage of the infants. The obstetricians will recognize that there is an infant problem earlier than they have to date.

Coming down on the train I came in with a man who is connected with the State Board of Health, who said that they are preaching "every doctor's office a welfare center," and I feel every hospital should be a "teaching center." We have been interested in refresher courses. We know that when we give a course we see the same faces; those fellows who need it least and who are the best men in the territory. Other men who really need the instructions do not go, and the only way you can pick them up is at the local hospital. I think, therefore, it is the duty of the obstetrician and those having to do with the care of infants to try and teach the men the better handling of infants in their own communities and hospitals.

CYANOSIS IN THE NEWBORN

A. H. PARMELEE

OAK PARK, ILL.

Cyanosis is a symptom. It signifies anoxemia and is the commonest of all signs of neonatal disease. The complex mechanism of respiration, and that of the closely related circulatory system must be quickly adjusted to meet the conditions of extrauterine life. Any hindrance to this adjustment is a hazard to the life of the infant, therefore, cyanosis is a symptom that demands serious attention. In eighty-five per cent. of the deaths that occur in the neonatal period cyanosis is a prominent symptom.

Deaths from all causes during the first month of life comprise about one-half of the deaths in the first year, and about three-fourths of these occur in the first week. These facts indicate that antenatal and natal factors are the most important causes of mortality in the newborn period. The reduction of this mortality, therefore, while it is essentially an obstetrical problem, requires the closest cooperation between the obstetrician and the pediatrician.

Cyanosis in the newborn may be the result of disturbances affecting primarily the respiratory system, the circulatory system, or the medullary centers in the central nervous system. Respiration and circulation are closely related functions and each is controlled by vital centers in the medulla. The normal functioning of any one of these three systems is so dependent upon the integrity of the other two that it is often quite impossible to determine the primary cause of cyanosis except by eventual postmortem examination.

A probable diagnosis can, however, be more intelligently made by a study of the statistics of postmortem findings in infants dying during the neonatal period. Cruickshank made a classification of the causes of neonatal death based on eight hundred autopsies. He found that in 67% death was due to what he designated "birth effects" (asphyxia, atelectasis, injuries and prematurity). Thirty per cent. showed infective conditions as the cause of death, and gross congenital malformations accounted for the remaining three per cent. In nine-tenths of the large group 67% classified as birth effects, death occurred in the first week of life, and practically all of them showed signs of asphyxia. In the group classified as infective conditions 30%, pneumonia was found in eighty-three per cent. A large number of these are due to the indirect effects of birth. Factors which predispose to atelectasis and asphyxial conditions in general, such as birth trauma, prematurity, and narcosis, produce favorable ground for the development of pneumonia.

Hunt analyzed one hundred eighteen postmortem examinations with respect to the frequency of the pathologic lesions causing cyanosis in the newborn. Intracranial lesions, including both meningeal hemorrhage and severe tentoral tears were the most frequent. The symptoms appeared early in these cases. The most common single lesion found was pneumonia. Presence of a hyaline membrane on the bronchial and bronchiolar surface due to aspirated amniotic sac contents was relatively common; it was associated with persistent cyanosis. Congenital heart disease was an uncommon cause, and other causes, such as septicemia, diaphragmatic hernia, and meningitis, were relatively rare.

With these facts in mind, we shall be better able to evaluate the relative importance of the various causes of cyanosis which will be discussed later.

First, we should go into the matter of the mechanism by which respiration is initiated. Respiratory activity begins, under normal conditions, almost simultaneously with the birth of the infant. It is generally conceded that the initiation of respiration is due to stimulation of the respiratory center and that CO_2 is the chief stimulant material. But the factors which govern the action of the stumulus are not well understood, and, in consequence, the explanations of the disturbances of respiration are not clear.

Schmidt says that the chief element in the chemical regulation of respiration is the concentration of the stimulant material within the cells of the respiratory center. This, he says, is dependent upon a balance among three factors: The concentration of the stimulant material in the arterial blood, the rate at which stimulant material is produced within the cells of the center, and the rate of blood flow through the center which determines the extent to which stimulant material can accumulate there. That the respiratory center is influenced directly by changes in

its blood supply, and that respiratory response to changes in systemic blood pressure depends chiefly upon changes in cerebral blood-flow have been experimentally proven. Normally, an increase in cerebral blood-flow depresses, and a decrease stimulates respiration. This suggests that products of metabolism of the cells of the center play a part in regulating the activity of the center. But there is an abnormal condition of the center in which respiration is depressed by a decrease in its blood supply, and stimulated by an increase. This abnormal state of affairs is spoken of as the "reversal." Apparently the ability of the respiratory center to respond to stimuli depends upon a supply of oxygen adequate to support the metabolic processes upon which the functional activity of the cells depends. Any agent normally a stimulant to respiration may, according to Schmidt, cause depression or failure if applied in the presence of oxygen-lack in the brain consequent upon subnormal cerebral blood-flow. All of this meanss, briefly, that the cells of the respiratory center do not respond normally to stimulation unless they are healthy, and their health depends largely upon an adequate supply of oxygen. Conditions favoring either local intracranial stasis or general anoxemia will, therefore, decrease the excitability of the respiratory center and interfere with normal respiration.

Fetal respiratory movements in utero have been demonstrated in experimental animals, and almost certainly take place in the human fetus. This indicates that the mechanism by which respiration takes place is already in existence before birth and will function after birth unless disrupted by the circumstances of birth or subsequent events.

Let us now take up the causes of cyanosis in the newborn. They may be classified, after the method of Bonar, under three main subdivisions: Those affecting the respiratory system, those affecting the circulatory system, and those affecting the central nervous system.

A. The respiratory system: 1. *Obstruction to the upper air passages.* This is most often due to the aspiration of amiotic fluid, mucus, blood, etc., but occasionally is due to extreme pressure on the trachea from tumors, such as a large lymphangioma (hygroma cysticum colli), a congenital goiter, or extravasation of a large amount of blood into the soft tissues from trauma.

2. *Faulty alveolar inflation.* Under this heading, *atelectasis* assumes a dominant place. The lungs of the normal full-term infant undergo gradual inflation during the first few days of life and, therefore, there is present in all normal newborns a variable amount of initial atelectasis during this time. This can rightfully be called "physiologic atelectasis of the newborn." Various hindrances to the respiration may result in the persistence of atelectasis to a pathologic extent. The main factors preventing the initial normal expansion of lungs are: a) Cohesion of the moist surfaces of the air passages in collapsed and airless lungs. This initial resistance of the atelectatic lungs to expansion is always present and contributes to the maintenance of atelectasis to a pathologic extent when combined with any of the following factors. b) An imperfectly developed, or an injured respiratory center. c) A poorly developed thorax (seen especially in premature infants). d) Bronchial obstruction due to the aspiration of foreign material. In regard to this latter factor, it is believed by some that the aspirated amniotic fluid gives rise to a prolonged catarrhal secretion, and that this amniotic mucus is more important in causing obstruction than is the original material aspirated. This is especially true if the cough reflex is insufficient. There are also secondary types of atelectasis. Resorption atelectasis, for example, in which areas of lung that have been *inflated* become obstructed, due to some hindrance to normal respiration, and the alveoli collapse as the air is resorbed from them. Some believe that primary atelectasis, even in the premature infant, is comparatively rare, and that a secondary type is much more common. Farber and Wilson also describe in the lungs of premature infants solid areas of parenchyma, superficially resembling *atelectasis, but not a true atelectasis* because they are uninflatable areas of immature and incompletely developed lung tissue. *Emphysema* may also result from the aspiration of foreign material. This is due to the fact that some bronchioles are only partially obstructed, permitting air to enter, but hindering its exit; the air thus trapped gradually over-inflates the affected lobule. When this phenomenon occurs at the periphery some of the air cells may rupture and

allow air to escape into the pleural cavity, producing a pneumothorax and collapse of the lung. It has been shown that some degree of pneumothorax occurs in approximately one per cent. of all newborns. *Edema, hemorrhage, and exudates* are especially likely to occur in the lungs of premature infants and interfere with normal functioning.

B. The circulatory system: *Congenital heart lesions* are sometimes the cause of *cyanosis, but* the incidence of such lesions is relatively rare. When *cyanosis is* present soon after birth, is persistent and increases when the infant cries, the heart should be suspected of being defective. More frequently, the increased load put upon the heart because lack of proper inflation of the lungs interferes with normal pulmonary circulation, causes gradual but progressive fatigue of the heart muscle. This increased load, *especially* upon the right side of the heart also causes the foramen ovale, *which had been functionally* but not anatomically closed, to reopen, and also *interferes with the closing* of the ductus arteriosus. In this way the heart reverts to its fetal type of circulation and we have what has been termed *"severe mixed-blood cyanosis."* When the conditions within the lungs again become normal the cyanosis will disappear, and also the murmurs that may have been heard will disappear. *Local cyanosis* or *local asphyxia* due to angioparesis is not infrequently seen when there has been prolonged local stasis in a part, as in a prolapsed arm or a leg. This condition is sometimes seen in the face or may involve most of the head, the rest of the body being normal in color. It is due to local vasomotor paresis, and clears up spontaneously in a few days.

C. The central nervous system: *Depression of the medullary centers* may be caused by 1. *intracranial injury,* especially if hemorrhage occurs. *Infratentorial hemorrhage* if profuse, as from a tentorial tear, usually causes asphyxia from which the infant does not recover. *Supratentorial hemorrhage* may not cause symptoms for several hours or even days, and cyanosis may be due to generalized convulsions or to depression of the centers from general increased intracranial pressure. Hemorrhage or general inteference with cerebral circulation will cause local anoxemia and destroy the ability of the respiratory center to respond to normal respiratory stimuli.

2. *Drugs and anesthesia* given to the mother during labor have a definite effect upon the vital centers. Various anesthetics given to pregnant animals will depress or may even stop the normal intrauterine respiratory movements of the fetus. It has also been conclusively shown that morphine given to the parturient mother within three hours of her delivery depresses the respiratory activity and causes asphyxia of her child.

Cyanotic attacks occur with much greater frequency in premature infants, largely, of course, due to the immaturity of their vital centers and the physiologic immaturity of their tissues in general, manifested by their special tendency to edema and to hemorrhage. Frequent cyanotic attacks in the first days of the life of the smaller *premature infants demand constant* vigilance on the part of their attendants to keep them alive. *Not infrequently* we see also, in premature infants, the recurrence of cyanotic attacks in the second or even the third week of life, after there had been a period of normal progress. These late attacks of cyanosis are not easily explained. Probably some are due to intracranial hemorrhage, but others can only be explained as the result of fatigue of the respiratory and perhaps of the cardiac musculature.

Treatment. a) *Prophylaxis or prevention* is, of course, the most important and most effective method of treatment. 1. *Prevention of prematurity* comes first in importance because the more mature the infant the greater his ability to adjust himself to extrauterine life. 2. *Better obstetric judgment and technic.* 3. *Good judgment in the type and method of administration of anesthesia.* 4. *Avoidance of opiates and barbiturates* near the time of delivery. b) *Active treatment.* According to Seitz, three and one-half per cent. of all infants are born in a state of deep asphyxia. This means that every obstetrician should be prepared to give proper emergency care to these infants. One important consideration in the care of the asphyxiated infant is that *chilling must be avoided.* Before any *method of resuscitation* is undertaken it is essential that foreign material, *which may be obstructing* the air passages, be removed by *means of a soft rubber* catheter or a bulb syringe. If you are adept in the use of the tracheal catheter it can be used to great advantage, but should not be used by a novice. Body manipulations are, as a rule, *more likely to do*

harm than good, and, except for the very gentlest manipulation, should be avoided. Temperature stimulation when performed in the proper manner has some value as a *resuscitating measure.* The infant should *never* be dipped in cold water, *however. Mouth to mouth insufflation* is an old and valuable method; its chief drawback is the danger of bacterial contamination of the infant's respiratory tract. The administration of oxygen, or of carbon dioxide and oxygen mixtures, is now more commonly *in use in hospitals than any other* method of resuscitation, and its life saving value *is unquestioned. Whether the addition* of carbon dioxide is an improvement over the administration of oxygen alone in combating asphyxia of the newborn is still a question in the minds of not a few. Mechanical respirators are not now as popular as they were a few years ago. They are expensive and by no means indispensable, and also there are certain *dangers connected with* their use, which makes the advisability of their general *use questionable. No medical stimulants* have survived the test of time and it is not wise *to recommend any for general* use.

Oxygen inhalations are also of great value in *many instances* in the treatment of cyanotic attacks due to other causes. In the premature infant oxygen can be given to advantage periodically for days or even weeks.

Detailed instructions for treatment have been purposely avoided *in this paper, because mortality* in the newborn period will not be reduced by *memorizing certain technics of* treatment, or by the use of a particular *gadget or apparatus, but much more by* closer study of the newborn infant, *and greater familiarity* with the physiology and pathology of this important period in the life of the human organism.

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DISCUSSION

Dr. Carl E. Sibilsky, Peoria: Dr. Parmelee has given us a stimulating *discussion on this important subject.* The importance and seriousness of cyanosis as a symptom is appreciated *when one considers the frequency* with which it occurs in a variety of conditions. He did not say anything about *treatment—purposely as* he stated.

There are some general principles to be observed in the treatment of cyansois, regardless of the cause or condition being considered: 1. The air passages must *be clear before* attempting respiration; 2. the body heat must be maintained; 3. handling of the infant must be *gentle.*

Physically, the newborn may be easily injured, and especially *the premature. Therefore, gentle handling* must be observed to avoid injury to the extremities long bones and soft tissues; *avoid crushing injury by* manual respiration movements due to awkward or too rapid methods of resuscitation. Rupture of the air cells may occur as a result of too sudden increase in air pressure. Unnecessary handling may only exhaust the *infant.*

Preserve the body heat by avoiding long and undue *exposure from the time of birth* to placement in a warm bassinet or incubator where the care of the skin, eyes and *cord can be attended to as well. This will* prevent chilling.

Clear the air passages *before any attempt at respiration* is made. This should be done immediately the head is delivered. The mouth, pharynn, larynx and *nose* should be cleared of mucus, amniotic fluid and blood to avoid aspiration of this material with the first sudden inspiration as a result of the sudden change of temperature from the intra-uterine to extra-uterine life. Asphyxia *and pneumonia* can be reduced because of these precautions.

After the air passages have been cleared, oxygen with five per cent. carbon dioxide or oxygen alone should be *administered. True cyanosis means,* or implies, anoxemia; therefore, oxygen is needed. There is the controversy between *those who do and those who* do not use the carbon dioxide combination. Both methods seem to work. However, it is conceded that carbon dioxide is the respiratory stimulant and carbon dioxide is carried from the tissues to the center in the brain by the blood stream. Asphyxia means low oxygen and low carbon dioxide content of the blood and tissues; therefore, the combination would appear to be *the choice in routine procedure. Mouth* to mouth in*sufflation is a valuable* respiratory stimulant if the gas combination is *not readily available.*

Respirators are not available to those of us outside large medical centers.

For atelectasis, *oxygen and carbon dioxide* periodically and stimulating the infant to deeper *respiration* occasionally are indicated. *This is accomplished by* making the baby cry.

If the cyanosis is due to intracranial hemorrhage oxygen and carbon dioxide should be given; the infant should be kept warm and handled as little as possible. If there is evidence of increased intracranial pressure, as bulging fontanelle, cistern puncture or lumbar puncture should be done to reduce the pressure. Intramuscular administration of father's blood should be resorted to in arresting the hemorrhage.

For congenital heart disease little can be done other than the occasional stimulant and avoiding unnecessary handling.

Cyanosis due to tetany is treated by the administration of calcium gluconate intramuscularly and orally.

Cyanosis due to pneumonia is treated with oxygen and carbon dioxide. There must be considered changes of position and other supportive measures.

Dr. A. H. Parmelee, Oak Park (closing): I should like to make a few remarks in regard to what Dr. Sibilsky said about the relative value of oxygen alone and carbon dioxide with oxygen. That is a question that is still not settled, and it may not be settled for some time. Eastman showed that the carbon dioxide concentration in infants' blood was much higher than in mothers' blood, and it would not seem that more carbon dioxide would be necessary. It is more important apparently in this type of cyanosis due to asphyxia that oxygen be supplied so that the respiratory centers will be more sensitive to the carbon dioxide that is already present. That is the view that seems most in favor at present.

Dr. Minsk has said one thing which I think we all should keep in mind: that convulsions sometimes are due to anoxemia and convulsions may occur without any actual damage to the brain and are due purely to anoxemia. We have seen children with congenital heart conditions with sudden attacks of cyanosis and convulsions probably due to the anoxemia.

Dr. Minsk also said that cohesion of the moist surfaces of the air passages is not a serious cause of atelectasis. That is true in itself but, as I said in the paper, this cohesion plus other factors, such as weak musculature and poorly stimulated respiratory centers, add to the possibilities of atelectasis.

SILICO-TUBERCULOSIS

HENRY C. SWEANY, M. D.

CHICAGO

The manner in which silicosis and tuberculosis enhance each other's progress is a unique medical phenomenon. The two are separate entities themselves and will run a definite course on their own account, occasionally killing quickly but more often slowly. Each may run through a lifetime without producing death at all. Each may also be so slight as to cause no clinical disease. Separated, they are problems which are being handled in stride by public health agencies, but together they are almost uncontrollable. Not infrequently in biology there are certain combinations that will result in a greater combined effect than the added effect of each taken separately. That seems to be true with regard to the "hybrid" disease complex known as "silicotuberculosis."

In this discussion, I am presupposing a general knowledge of both silicosis and tuberculosis. My purpose is to describe the joint action of the two as nearly as known facts will permit, with the modifying action of other factors such as inert dust and acute infection.

At the outset, let it be clearly understood that we are not dealing with a disease entity. It is a "blend" where every shade between the two conditions may be found as well as other associated peculiarities. Only the principal types, therefore, need be described as a "descriptive framework" for the whole disease complex. These types are arranged on the basis of the relationships of the factors involved, which depend on the time of appearance and dosage of the tubercle bacilli; the character of the tuberculous condition at different periods; the amount, purity and size of particles of silicon dioxide; the character and amount of other dusts taken in with the silicon dioxide or at other times; and whether the individual is a mouth breather, has impaired respiratory apparatus in the form of a bronchiectasis, or has cardiac or any other disease to damage the pulmonary physiology.

First, let us consider what seems to be a very common combination—that of a well-developed silicosis which slowly becomes tuberculous. The tuberculosis arises but gradually from a latent process. Incidentally, this observation seems to be a good indication for the persistence of living tubercle bacilli in the body, and throws much light on endogenous tuberculous spread. The silicosis appears to interrupt normal healing of old tuberculous foci and turn it into a slowly progressive process. The development of the process may be recapitulated hypothetically about as follows: the patient may be exposed to silica for many years but does not notice any difficuty; the roentgenogram may indicate nothing at all or a first or second degree silicosis. If no tubercle bacilli are present, the man may work throughout life and

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From the Research Laboratories of the City of Chicago Municipal Tuberculosis Sanitarium.

only develop a mild or moderate silicosis that may only shorten his breath and decrease his chest expansion a little more rapidly than normal. If tubercle bacilli chance to be present in an old healing process, the changes which subsequently occur are in proportion to the rapidity of the awakening of this tuberculous infection. The bacilli seem to be stimpulated to renewed activity by the silica or the silicotic process as well shown by Gardner[1] and Gye and Kettle[2]. Instead of remaining within the old foci and ultimately dying out completely, they slowly come out of "hibernation" and proceed from lymph node to lymph node and set up at first a mild but always a progressive process, and later a precipitate disease that ends frequently as a tuberculous bronchopneumonia.

The first signs of this change may be noted on the x-ray, as first indicated by Pancoast and Pendergrass,[3] and described in one of my earlier articles.[4] The nodules, ordinarily smooth, round or oblong and of a soft uniform density, become denser in the center, fuzzy and irregular around the border, and of unequal density.

They usually become quite large and may develop in large masses by a sort of "overflowing" of the tuberculous process around the border.

At the same time the lymph nodes become larger and definitely calcified, much in the manner of the calcification of primary tubercles. There is not the specific capsule, however, and no other features are in common with primary tubercles. This type of calcification when found in adults is almost pathognomonic of silicotuberculosis, because primary tubercles in adults rarely have a large lymph node involvement. There is obviously no problem in the young because silicosis is not found under 25 years of age. The calcification most frequently takes place beneath the capsule of the node, so that on the x-ray it will have the appearance of a ring. This type we have called "egg-shell" calcification[5] because it is situated around the circumference and, on compressing such nodes between the fingers, it feels like crushing an egg shell. The probability is that the more superficial the process, the later was the appearance of the tuberculosis, because after the node has become fibrotic the only open lymphatics are near the capsule. Most of such nodes are hidden behind the heart, but not infrequently the bronchopulmonary nodes may be visible out from the hilum. To visualize these nodes a lateral or oblique-lateral picture will expose them better.

During the early stages there are no good laboratory examinations of value. The blood and urine studies have been disappointing because of the tremendous fluctuations, due to diet. Ultimately, if the patient's silica level can be established on a constant silica intake, it may be found useful. At this stage there is also no sputum, so nothing can be added by a sputum study.

As time goes on the nodules in the lung may enlarge to masses, or the bacilli may increase to such an extent that caseation results, which is followed sooner or later by ulceration. The only added feature roentgenologically is the presence of early cavities and an increase in the fuzziness of the x-ray shadows until there is a blotting out of the silicosis appearance. The trachea is usually found in the mid-line, and the disease progresses bilaterally.

Microscopically, the fibres around the outside of the nodules become much thinner, and small accumulations of lymphoid tissue appear at intervals around the margins; the central part becomes caseous until there may be no trace of fibres at all. This was described before[5] as a "washing out" of the fibres, as in the making of water colors. Like all other phases of this problem it is a slow progression. Sometimes there may remain a "core" of heavy fibres around which the tuberculous phase is superimposed. Such conditions suggest that the silicotic nodules were first and the tuberculosis was relatively recent.

In the laboratory examination of the sputum of such cases there are rarely found tubercle bacilli at the beginning of expectoration, and there is every reason to suspect that few are present. Later on a few may appear, but only when a terminal tuberculosis develops do the bacilli become numerous. It has been suspected that these bacilli are of low virulence, but Cummings[6] was unable to find any reduction of virulence in such strains of tubercle bacilli.

Recently, due to the fundamental work of Clark and Reynolds,[7] there have been developed systems of analysis by x-ray diffraction, so that it may ultimately be possible to determine the pathological levels of silica and other substances in the sputum. In our institution Klaas[8] has made preliminary studies directly on powdered lungs with gratifying results. Jephcott and as-

sociates[9] have made similar studies on digested lung samples with promising results. They were unable to fix the threshold level of silica that results in pathology, as we are apparently able to do on direct studies; but if quantitative figures can be obtained such a level can easily be established. A quantitative method, therefore, may be evolved from digested samples that will permit of a sputum analysis for detrimental silica, which will be a great aid in diagnosis.

As stated before, the whole disease process changes gradually from one that may be typical of silicosis to one that does not look at all like it but like a fibroid tuberculosis or even a tuberculous bronchopneumonia. Towards the end of the disease course the majority of these cases are so much like tuberculosis that there is no way of telling the presence of the silicosis component except by the history or by laboratory analysis. This condition suggests the advisability of serial x-rays where possible, to detect the progressive tuberculosis or to apprehend the silicosis before it becomes obliterated.

Throughout our various reports there are many cases of this type. Many of these have been illustrated. Attention is especially called to one former report,[4] (case 1 and figure 1), where there is still a silicotic aspect at the time of death.

Next in importance, I believe, is a group where the silicosis is first developed and tuberculosis comes on afterwards as a definite exogenous process which varies with the time of appearance of the tuberculosis and the dosage of the bacilli. There is usually a rapidly ulcerative process in the upper parts of one or both lungs with varying degrees of infringement on the silicotic process. There are apparently many such cases reported in medical literature. Agricola cited an instance among the miners of the Carpathian mountains, where a woman was known to outlive seven husbands. The probability is that in such a rapid sequence of death and matrimony amongst the miners, the perpetual wife was an old fibroid phthisic who was awaiting each new silicotic spouse with a quick-acting dose of bacillus tuberculosis. Case 22, of the work with Porsche and Douglass,[5] represents one of this group. Another is case 27 which has such unusual interest that full details will be reported here for the first time. The tuberculosis in this case, however, is not quite so rapid, as is usually the case.

Case 1 (case 27 of former report): J. E. (A737) was born in Ottawa, Illinois, in 1905. He attended public school till 1920, worked in a printing plant till 1922, and then worked for six months in what he said was a "cement factory." He was then a chauffeur till 1924, after which he came to Chicago where he worked till 1928 as a clerk for the Chicago and Northwestern Railway. He was out of work till 1930 when he began work as a wholesale grocery clerk; but in 1932 he developed a cough. It became severe by March, 1933, so that he was forced to quit work and rest. A nurse calling to see his sister's baby, advised him to go to the dispensary. This he did, and was diagnosed tuberculosis. At first he was sent to the Cook County Hospital to break contact with the baby, then to the Municipal Tuberculosis Sanitarium where

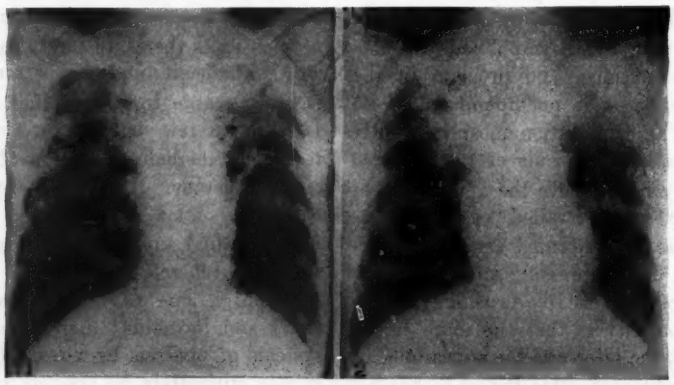

PLATE 1

Fig. 1. Roentgenogram of J. E. (A737), taken on admission to the Sanitarium. Note the characteristic appearance of tuberculosis.

Fig. 2. Another, taken just before death. Note the increase in the size of the heart—much more than the extremes of the cardiac cycle would warrant. The gross and microscopic photographs of this case are shown in Arch. Path., Nov., 1936, Vol. 22, p. 620.

the same diagnosis was made. No suggestion of silicosis was ever made until the postmortem examination, when an advanced silicotuberculosis was found. "There were shrunken fibroid cavities in the upper lobes of both lungs, with heavy fibrous caps over both apices measuring between 1 and 2cm. in thickness. In the mid lung fields were numerous small slate-gray nodules

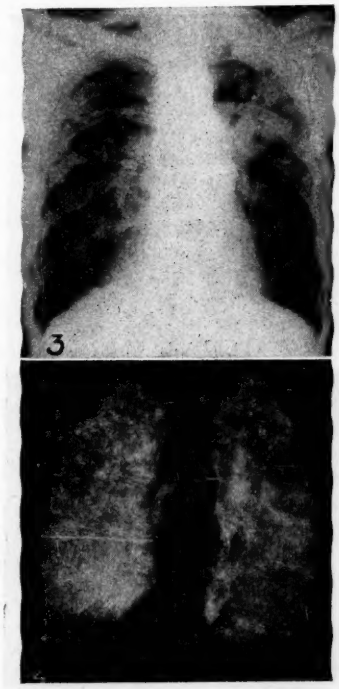

PLATE 2

Fig. 3. Roentgenogram of F. G. (A429), on admission to the Sanitarium.

Fig. 4. Post mortem roentgenogram. Note several calcified nodular tubercles in the base and a scattering of calcified foci in the uppers. There was a solid slate-gray fibrous cap over both apices and large slate-gray lymph nodes at the hilum.

measuring 2-3 mm., some of which were caseous. Towards the base the nodules were smaller." (Plate I, Figs. 1 and 2.)

"At the bifurcation of the trachea the lymph nodes were enlarged to about 4x5 cm. tough, fibrous and of a slate-gray appearance."

Immediately after this case was reported in the literature, I received letters from several sources (including Dr. Gardner) calling my attention to the fact that work in a "cement factory" was not enough to explain the silicosis. This, of course, was granted, but nothing else in the history, clinical findings, nor x-ray had suggested it. The "cement factory" history was put in quotation marks, indicating that the patient himself had made that statement, but it was only to be taken for what it was worth.

After this, however, an attempt was made to clear up the case by consulting his relatives. Nothing definite could be found because the old firms for which he worked ten years before had closed down. Fortunately, Dr. Roswell Pettit of Ottawa, Illinois, voluntered to investigate the matter, and apparently succeeded in obtaining a satisfactory explanation of the source of the silicosis. Quoting from a letter dated December 9, 1936, Pettit states as follows: "I am of the opinion that the man you are asking about was probably employed at a plant located between Ottawa and La Salle, Illinois, that was formerly used as a cement mill and then was later employed in some silica work." And on January 29, 1937, the following is part of another letter: "Today a letter comes from Mr. P. N. B., who investigated the previous employment of J. E., that confirms my statement to you of last week. Mr. B., informs me that J. E., worked in a cement plant from July 3, 1920, to December 31, 1920, as an oiler in the basement of the power house. This was three years previous to the dates J. E. gave you, that is, 1923. Later he worked in a cement plant, from September 23, 1922 to

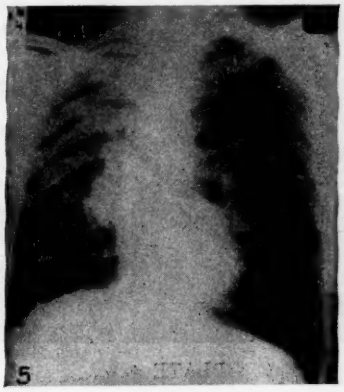

PLATE 3

Fig. 5. Roentgenogram of M. R. (A411), a quarry worker for nine years. Note the typical appearance of fibroid phthisis.

November 30, 1922, in a shipping department—two months; a total employment in the cement industry of eight months."

"Later, according to Mr. G. L., who now runs a small sand business in Utica, Illinois, J. E. was employed in the *American Mineral Grinding*

Company and Illinois Pulverizing Company, a concern that processed silica sand, grinding it into fine powder for use in cleaning powder, etc. Mr. L. states that J. E. was employed there in 1923 *or* 1924, *probably four to six months.* You may consider that four months in such a silica grinding industry was a short exposure, but it was common knowledge in and around La Salle that a number of deaths occurred as the result of working in this particular plant where it is reasonable to assume little or no protection against inhalation of very finely powdered silica was employed. I have a number of cases in my files working under similar conditions that acquired a definite pulmonary silicosis in less than six months."

Perhaps his exposure in the silica was so short and insignificant that it was not considered of any importance when his history was taken, by both patient and doctor, and the clinical examination, and especially the x-ray, revealed nothing of a silicotic nature. Usually a complete "dust" history in a tuberculosis sanitarium is not practicable unless there is something in the history

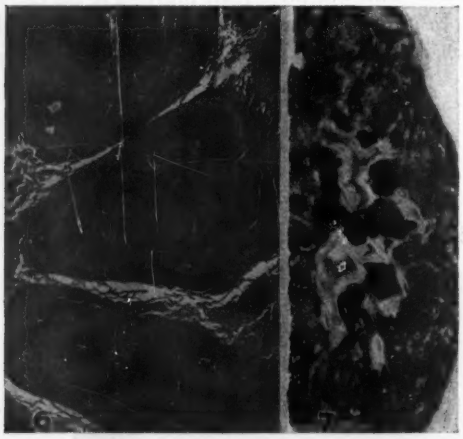

PLATE 4

Fig. 6. Low power photomicrograph showing large nodular whorls with coarse fibres in the centre but thin and caseous fibres around the periphery. X 20.
Fig. 7. Gross photograph revealing the hard gray-black lymph nodes.

or x-ray to suggest it. The illustration reveals that the x-ray is typical of a far-advanced tuberculosis, and nothing at all to suggest silicosis. The only feature is the short exposure, but the recent experience in Gauley Bridge, West Va., and the old report of Betts,[10] shows that large amounts of finely divided silica will produce silicosis in a short time. Heffernan[11] also believes that the existence of acute silicosis can no longer be doubted. The unusual feature in this case is that he had no symptoms of disease until his tuberculosis came on eight years later. Had he

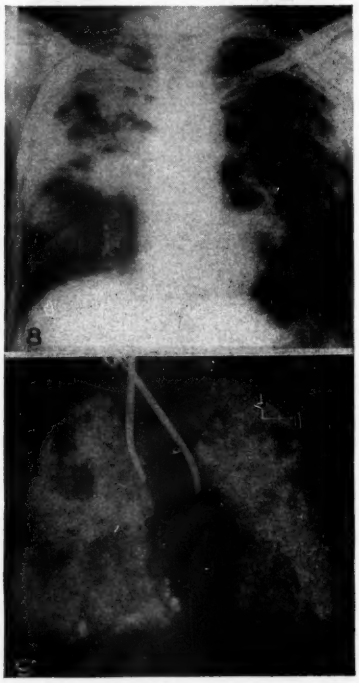

PLATE 5

Fig. 8. Roentgenogram of J. P. (A802), revealing an appearance of fibroid phthisis.
Fig. 9. Post mortem roentgenogram. Note the peculiar calcification of the lymph nodes. Photomicrographs of this case are shown in Arch. Path., Nov., 1936, Vol. 22, p. 612.

not contracted the tuberculosis he may have lived to be old. The tuberculosis was either taken in at the time of the dust exposure or, more probably later, and developed along characteristic lines, concealing any signs of silicosis that may have been present. Had an x-ray picture been made years before the nodules of silicosis may have been seen, but there was apparently no illness to warrant it.

Another type of case is one wherein there is fibroid tuberculosis present before the silicosis appears. This is the most difficult of all to evaluate. There are no signs, symptoms, or findings that will differentiate this group from tuberculosis except chemical analysis. The x-ray may

show unilateral or bilateral nodulation resembling silicotuberculosis, but it is usually apical, unilateral, or regional, so that it cannot possibly be distinguished from tuberculosis without a chemical analysis.

The following cases of the work with Porsche and Douglass[5] illustrate this type: Cases 20, 9, 15 and 19.

Cases 20, 9, and 15 all reveal regional involvement. Case 2 (case 20 of the former report) was a knife grinder for thirty-seven years. Outside of a terminal tuberculosis on a silicotuberculosis there was a peculiar regional involvement along subapical bronchi to the upper lobes. The third case (case 9 before) gave a history of an "engineering draftsman" for over thirty years. It is probable that the true cause of silicosis was not given in the history. At any rate there was a bilateral and apical involvement with silicotic lymph nodes, not at all typical of a silicotic localization (Plate 2, Figs. 3 and 4.) The fourth case (case 15 before) was a molder for thirty-five years. There was a tuberculosis which perhaps preceded the silica exposure, and as a result there was a marked exaggeration of not only tuberculosis but of silicotic involvement on one side. This was illustrated in an earlier report (4).

Case 5 (case 19 of former report, but not given in detail) was a quarry worker for nine years. There was evidence of an antecedent or simultaneous tuberculosis with a slight silicotic component. The chemical analysis revealed a pathological level of total silica, but the x-ray diffraction pattern did not reveal enough silicon dioxide to cast a characteristic shadow on the undiluted lung sample. This type of case illustrates the most difficult type to evaluate, because there is only a slight picture of silicosis on an advanced tuberculosis, yet there is definite evidence of a gross and microscopic silicotuberculosis of the lymph nodes. (Plate 3, Fig. 5; Plate 4, Figs. 6 and 7.)

Without confusing the picture unduly, the effect of other dusts on the various conditions previously described must be mentioned. This is particularly true of coal and iron, but there are many other dusts, each with a different effect. Perhaps only one type need be mentioned, and the rest must be left much to the imigination to fill in. Reference is also made to the work with Porsche and Douglass, where several of this type are illustrated, case 40 especially.

The result depends upon the time of appearance of each ingredient. Coal dust (and perhaps also iron), instead of enhancing the development of silicosis and tuberculosis, seems to cause a dampening effect on both; it seems to slow down both diseases, as shown by the work of Cummings,[12] as well as our own. Instead of the nodulation there are usually formed huge clouds and masses out in the lung parenchyma. Sometimes such conglomerate shadows will form without coal and iron, but it is not so frequent. This is due, perhaps, to the marked stimulation of phagocytes by coal and iron. These phagocytes then engulf pigment and silica and accumulate in great masses. There may be enough silica present to cause the fibrosis to form into skeins rather than whorls. Many times the pigment may be arranged in between the "skeins" of fibrosis. The phagocytes become so numerous and accumulate so much carbon that they frequently break and liberate the pigment. It is taken up by other cells and so on until the liberated enzymes digest away the fibrous tissue forming first, fissures, then stellate cavities, and finally huge cavities lined with black pigmented solid tissue.

Most of the cases formerly reported have a well-established silicosis. Case 6 (case 11, before) a blacksmith and tool grinder for forty years, is one where the silicotic component was very slight. In fact, there was very little gross evidence of it and only a postmortem x-ray of the lymph nodes and microscopic sections of some of the nodules were typical. (Plate 5, Figs. 8 and 9.) The chemical analysis was just above the threshold of pathogenicity.

As stated before the amount of silicosis present helps to determine the course. If the coal is predominant the lymph stasis prevails and the patient is prone to develop acute infections, bronchitis, bronchiectasis and pneumonia. As the silicosis increases, the tuberculosis comes more into the foreground. Each coal mine or type of work will, no doubt, vary from every other type unless the various irritants are in the same proportion.

SUMMARY

The whole field of silicotuberculosis seems to be, therefore, related to three factors—silicosis, tuberculosis and inert dust. The silicosis and tuberculosis enhance each other; the coal dust tends to check both, but is prone to cause the development of huge masses and finally cavities. If the inert dusts predominate the fourth hazard appears, viz.: acute infection. The hazard of acute infection, however, is not in the same category as the silicotuberculosis, or even silicosis.

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THE VALUE OF FLUOROSCOPY AND ROENTGENOGRAPHY IN THE STUDY OF CERTAIN DISEASES OF THE NECK

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The laryngologist, the bronchoscopist and esophagoscopist are all concerned in any method which will increase their diagnostic efficiency in the study of the neck, cervical esophagus and upper respiratory tract. The most valuable of all supplementary methods are fluoroscopy and roentgenography. By means of the former, they may observe the tongue, epiglottis, soft palate, larynx, esophagus and trachea in action and, with the latter, they are able to make a record of various phases of this action. They are able also to record progress of disease or treatment of parts of this region from time to time.

The purpose of this paper is not to present something new and startling, but rather to stimulate your interest and desire to make a more frequent use of this very valuable method of studying the neck and its contents. To obtain the greatest efficiency in the application of this method there must be the closest co-operation between the laryngologist and the roentgenologist. Without it little progress can be made. By the very nature of our training as laryngologists we are more familiar with the anatomy and physiology of the neck and its contents than the average roentgenologist. Therefore we owe it to ourselves to develop and retain a fine spirit of co-operation for the mutual benefit of each.

Historical. Shortly after the discovery of the x-ray, Scheier presented a paper on laryngeal cartilages. In 1909[1] he studied the speech mechanism and in 1911, the swallowing act. Iglauer,[2] in 1914, was a pioneer in the United States in work on roentgenologic diagnosis of disease of the larynx and trachea. In 1921 Pfahler wrote on the thyroid; Tucker, in 1925, on retropharyngeal abscess, and Manges, in 1925, on non-opaque foreign body in the trachea. In 1929 Hays published the first collective study of the entire upper air passages and soft tissues of the neck. Since then many papers on the subject have been published both in the United States and in Europe.

General Technique. In studying diseases of the neck and its contents some systematic method should be developed and adhered to.[3,4,5] A careful history[13] should be taken, a complete physical examination made and a blood Wassermann or Kahn done, unless the cause of the condition or disease is evident. An indirect examination by mirror and an x-ray study should be made. In chronic cases, where cough or chest symptoms are present, a chest study and sputum examination are important. This applies especially in children.

After this preliminary study, the neck and its contents are observed fluoroscopically. The position of the tongue, the epiglottis, the soft palate, hyoid bone, the pyriform sinuses and the soft tissues of the retropharynx, retrolarynx and retrotrachea are observed. The arytenoids, the aryepiglottic folds, the ventricles and the thyroid and cricoid cartilages are studied. The illuminated or air-containing spaces of the pharynx, the vallecula, the laryngeal vestibule and ventricles and the trachea are examined. Any encroachment into these spaces is noted. Probably the most useful and valuable aid the x-ray offers us in the study of the neck lies in the remarkable clearness with which these encroachments can be studied.

We may divide the structures into three groups and three or four anatomical zones, according to Hirsch and Baum.[6] In the first group are the osteocartilagenous structures, including the horizontal ramus of the mandible, the hyoid bone and its cornua, the laryngeal cartilages, the tracheal rings and the second to the seventh cervical vertebrae. Under the second group fall the various soft tissues less dense to the x-ray, such as the base of the tongue and floor of the mouth, the soft palate, the submaxillary region, the prelaryngeal, pre-tracheal and post-tracheal structures and the posterior pharynx. Under the third group are the illuminated areas containing

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air, the vallecula and pharyngeal vestibule containing moist air, the laryngeal ventricles containing less, the laryngeal vestibule still less and the subglottic filled the least.

Division of the neck from the lateral view may be divided into zones.[6] This division may be of value in locating and describing more exactly the extent and location of lesions. These zones are the suprahyoid above the hyoid bone, the thyroid between the thyroid cartilage and the hyoid bone, the thyrocricoid containing the larynx proper and the tracheal zone below the larynx.

After a general fluoroscopic examination of the neck and its contents, the action of the tongue, epiglottis, soft palate, hyoid bone, larynx and esophagus in the act of *swallowing* is observed. The swallowing of an opaque mixture greatly facilitates the study. Pancoast,[3] Mosher[7] and others have described the various stages which they have observed during the act of swallowing. If there is any abnormality in this action, as seen on lateral, oblique or anterior views, roentgenograms may be made for further detailed study and record. This is of particular

Fig. 1A. Female, age 19, showing irregular distribution of calcification of laryngeal cartilages which might suggest the presence of laryngeal disease or foreign body.

Fig. 1B. Shows more extensive calcification in female 28 years of age who had had considerable x-ray treatment for goiter 14 years previously.

Fig. 1C. Demonstrates the loss of detail and sharpness in laryngeal structures in a case of marked acute laryngitis with edema in male age 26.

value in studying cases of paralysis of the swallowing muscles,[7] retropharyngeal diverticulum,[7,8] postcricoid and esophageal webs,[7] abnormalities of movability of the epiglottis, arytenoid and the larynx due to the presence of growths, of inflammation and in disturbance of esophageal function.

Next the larynx is studied fluoroscopically. The ventricles are observed as zeppelin-shaped structures, superimposed on lateral view. Any

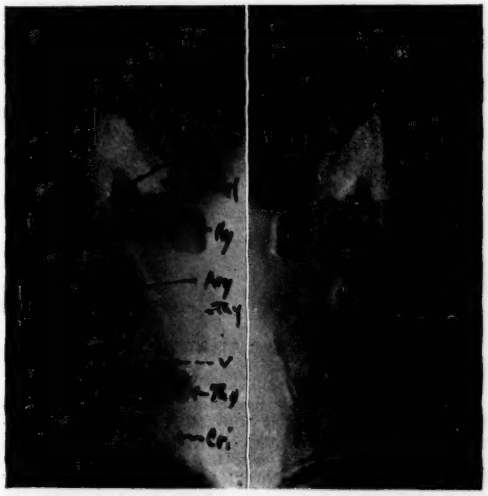

Fig. 2. Shows edema of the epiglottis, arytenoids, aryepiglottic folds, etc., with marked narrowing of the air-way through the larynx. This man, aged 64 years, noted soreness of his neck five days before, followed in 48 hours by rapidly increasing hoarseness and difficulty in swallowing. Upon admission he was unable to swallow liquids and was gasping for air. White blood count was 28,800 with 92% segmented cells. During direct laryngoscopy an incision was made into the left edematous arytenoidal mass which almost completely obstructed the laryngeal vestibule. Pus was evacuated. Rapid recovery ensued.

deformity or obstruction in this air-containing space may indicate inflammation, edema, tumor or paralysis. While the patient pronounces certain vowel sounds,[9] any changes in the ventricles are noted. The arytenoid cartilages project into the illuminated zone of the vestibule and onto the aryepiglottic folds. The degree and location of calcification or deposits of lime salts in the laryngeal cartilages is observed.

Lateral roentgenograms are then taken during phonation of a vowel sound such as "a."[9] Following this, another lateral film is made immediately after the patient has swallowed a small amount of lipiodol, a little bismuth milk or other opaque mixture. Stereoscopic films give a third

Footnote: Only a few more common and representative cases are presented here. Abbreviations used are: Abs—abscess, Ary—arytenoid, Cri—cricoid cartilage, Ayepi—aryepiglottic fold, Ep—epiglottis, Hy—hyoid bone, Tr—trachea, Thy—thyroid cartilage, V—laryngeal ventricle, Val—vallecula.

dimension and therefore separate the various structures which are observed as superimposed on single lateral films.

In certain diseases or conditions it is of value to study the chest at the time the neck is being

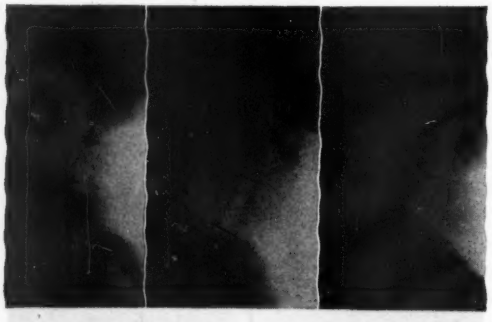

Fig. 3. Is from a case of acute edema of larynx, acute cellulitis and deep cervical abscess of neck below larynx and early upper mediastinitis.

Fig. 3A. Shows extensive edema of epiglottis, arytenoids, aryepiglottic folds and soft tissues of larynx after lipiodol had been dropped over the back of tongue. In male, aged 37 years, who had influenza a week before, followed by sore throat hoarseness, and swelling of the left side of the neck. Difficulty in swallowing and breathing increased rapidly. Considerable discomfort and feeling of marked fulness in upper mediastinum increased and patient became very apprehensive.

In lower part of figure 3A four arrows point to abscess showing changed density. In figure 3B the narrowed air-way is shown by arrows. Other arrows marked "AB" show abscess changed while arrows marked C indicate the extent of external swelling.

The deep cervical abscess was incised and drained. Local and general treatment brought about a rapid reduction of edema making tracheotomy unnecessary.

observed. This is frequently of great importance in children. The mediastinal blood and lymph systems and posterior fascial planes are continuous with those of the neck. Retropharyngeal invasions are particularly prone to invade the mediastinum. Deep cervical abscesses seek the same region.

In general, we may observe by x-ray studies a disturbance in the relationship of structures and air spaces in edema, inflammation, tumors, paralysis and in some foreign body cases. A fungating growth or rounded tumor projecting into the air spaces may or may not disturb the relationship of structures, depending largely upon the size, location and extension of the growth. On the other hand, infiltrating tumors deform the contour and increase the shadows, as observed in the encroachment onto or into the air spaces. Inflammation and edema diffuse the outlines of involved structures. Edema, in particular, disturbs the relations and invades air spaces with greater freedom than tumors. If there is an inflammatory invasion of cartilages, irregular defects may be seen as in ulceration and necrosis.

Calcification of Laryngeal Cartilages.[12] In 1896, shortly after the discovery of the x-ray, Scheier presented a paper on the laryngeal cartilages and their calcification. Because calcification and the deposition of lime salts are observed as dense roentgenographic shadows which may resemble those of foreign bodies, special interest has been given to determine the relationship of age and growth of the individual to the time and amount of deposit. There are so many variations in the time of appearance, in amount and in the distribution, that no definite rules can be laid down. In general, however, it has been concluded that "calcification of the laryngeal cartilages normally begins when the skeletal growth is otherwise complete." [10] The process is more gradual and less extensive at all ages in women than in men.[10] It begins in the postero-inferior part of the thyroid cartilage, invades the lower horns and spreads forward along the lower border and later, especially in males, spreads to the superior horns along the upper margins. The cricoid begins calcification a little later, first in the posterior part of the signet and later in the

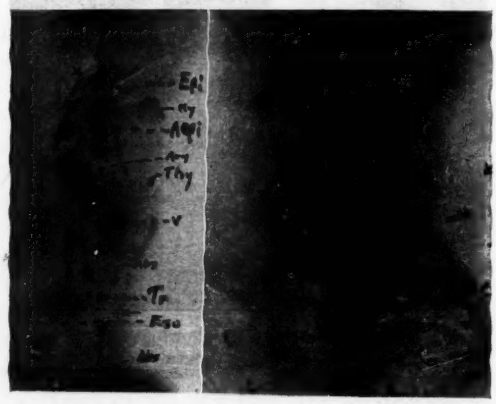

Fig. 4. Shows various degrees of retropharyngeal abscess in children under 18 months of age. Fig. 4C shows extreme dissection of the tissues from the base of the skull to the mediastinum. Recovery occurred after incision and adequate drainage even though a mediastinal invasion could easily have proven fatal.

anterior part. Arytenoid calcification appears about two years later.[10] According to Brown and Reineke, calcium in the female is likely to be laid down in dense spots, while in males it is likely to be more diffusely distributed. More-

over, the distribution is not always symmetrical in both sides of the larynx.

Foreign Bodies. Foreign bodies are usually found below the level of the larynx, but occasionally they lodge just behind the cricoid.[8] They may also become buried in the soft tissues adjacent to the larynx. The x-ray is of special value in differentiating irregular and scattered areas of calcification and opaque foreign bodies in these regions. It is also of very great value in studying foreign body problems and planning their expeditious removal from the larynx, trachea, cervical esophagus and pharynx. This careful preoperative study with the fluoroscope and films, lateral, antero-posterior and, at times, oblique, has saved valuable operative time, has simplified operative procedures and, without a doubt has saved lives.

Fractures[11,12] of the laryngeal cartilages occur in both adults and children. They are most frequent in the thyroid. Their detection by the x-ray is not as satisfactory as by a history of hoarseness, bloody sputum, presence of crepitus or subcutaneous emphysema. *Dislocations*[11] of the thyroid cartilage may be visualized during manipulation of the larynx under the fluoroscope. There may be an asymmetry of the thyroid cartilage which causes the pyriform sinus to be smaller on one side than on the other.

Fig. 5A. Shows a retropharyngeal abscess before drainage in a male 58 years of age who had had increasing difficulty in swallowing for two weeks before admission. Incision and drainage.
Fig. 5B. Shows x-ray just before second incision and drainage. Recovery.

Edema. One of the principal reasons for presenting this paper was to reemphasize that presence and extent of edema in the neck and its contents can be easily demonstrated by the so-called soft tissue technique. Many times we have all felt the need and great urgency to find out how extensive and how serious to life the edema was in cases of impending laryngeal obstruction.

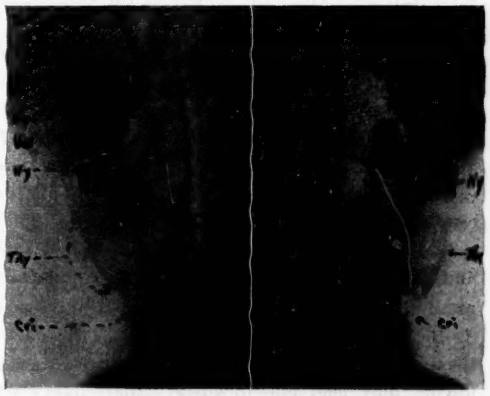

Fig. 6A & B. Shows extreme narrowing of the glottis, absorbtion of parts of calcified areas of laryngeal cartilages and edema and ulceration of the party wall between the hypopharynx and larynx. A diagnosis of advanced pulmonary tuberculosis was already made in this male about 60 years of age but a laryngeal examination and x-ray gave a better understanding of the situation in the larynx.

Edema occurs in children and adults. It is particularly serious in children under two years of age and in some streptococcal throat infections in the adult. Mirror examination of the larynx is at times almost or quite impossible. Direct examination, if done, would reveal the condition of the presenting surface only and would tell us nothing about the extent of involvement. X-ray then comes into its own and reveals the true extent of the invasion. Here again the use of a few drops of lipiodol, dropped on the back of the patient's tongue, will outline on the film more evidence than one taken without it. The edematous areas are seen projecting into the air spaces of the regions involved.

Retropharyngeal abscess is found most frequently in children but also occurs in adults. The retropharyngeal space or tissues is known to be very sensitive to inflammation and injury, particularly in the upper part of the pharynx. Inflammations and abscesses in this space easily spread downward into the mediastinum. Therefore the chest, as well as the neck, should be studied and watched until the danger has passed. It should be borne in mind that retropharyngeal abscess may also be associated with a tuberculous

lesion of the cervical vertebrae. Mosher has pointed out that the behavior of the postpharyngeal space is an index to the extent of trauma to the esophagus and the extent of the resulting inflammatory reaction. Even after removal of a foreign body from the mouth of the esophagus, swelling may remain for days to weeks.

Webs of the esophagus and pyriform sinus[7] may be demonstrated after the patient is directed to swallow some opaque mixture. Occasionally they are seen behind the cricoid or just below. When single, they are probably due to ulceration, infection or injury. If at the mouth of the esophagus, they may be easily overlooked. They may also be found an inch or so below the cricoid and are occasionally broken down accidentally at the time of esophagoscopy. After the passage of the rigid tube, the patient feels relieved of his symptoms. The history of difficulty in swallowing may lead one to suspect malignancy or, at least, should rule it out. Webs in the pyriform sinus cause a sensation of something sticking in the throat. The swallowing of opaque materials, while under the fluoroscope, should give evidence of the cause.

Diverticulum of the hypopharynx[7,8] occurs in the region just behind the cricoid cartilage where the posterior wall of the hypopharynx is the thinnest. The musculature is weak or absent at this point and herniation of the esophageal mucosa may occur, resulting in diverticulum of the hypopharynx. Jackson has demonstrated that this type is not a true esophageal diverticulum.

Strictures of the esophagus may occur just behind the cricoid and cause pulsion diverticulum of the hypopharynx.[7] Ulcers, infections, trauma and lye burns may result in webs or in strictures of the cervical esophagus and can be demonstrated after the swallowing of opaque mixtures.

Exostoses of the cervical vertebrae should be looked for. As pointed out by Mosher,[7] their presence may be a contraindication for the passage of a rigid esophagoscope. They may cause difficulty in swallowing. Webs may be associated with exostoses.

Paralysis[7,14] of the muscles of swallowing may be shown under the fluoroscope as an opaque mixture is being swallowed. The paralyzed side shows a bulging of the pyriform sinus and lateral pharyngeal wall on the involved side as seen in the antero-posterior view.

Mention only will be made of *Tumors*. A great many papers have been written about them. Tumors are found in many parts of the neck and its contents. In most places the x-ray will afford a better knowledge of their extent and encroachment upon other structures and the air spaces than any direct method of examining. In the larynx their invasion of the ventricle is of greatest significance in the war on early laryngeal cancer.

Tuberculosis and *Syphilis* involve the larynx.[2] When the cartilages are attacked, tuberculosis may cause a decalcification and there may be a characteristic washed out, hazy appearance and a thickening of the soft tissue shadows. In syphilis there is a tendency to increased calcification of the involved cartilages.

Trachea. Occasionally it becomes necessary to know whether a tracheotomy tube is fitting the trachea properly. This can be easily observed by the use of the x-ray. Tumor of the upper end of the trachea is more easily demonstrated as a mass projecting into the air space of the lumen. An examination of the upper end of the trachea reveals the amount of subglottic edema and aids in the differentiation between this type of edema and other causes of laryngeal obstruction. X-ray is also of much value in determining the degree and extent of compression stenosis of the trachea as in the presence of substernal thyroid or large adenoma of the thyroid.

CONCLUSIONS

1. The roentgen examination of the neck and its contents has not been given as important a position in roentgenographic procedure as have other parts of the body.
2. It is of value in determining the location and extent of edema, of inflammation, abscess and tumors, particularly in regions not easily examined by other methods.
3. It is of value in determining the degree of encroachment upon the lumen of the trachea from outside pressure of goitre and thyroid tumors, etc.
4. It is of value in studying and recording the progress of disease or treatment.
5. It is of value in the preoperative planning of surgical procedures and study of foreign body problems.
6. By this method structures of the neck may be divided into osteocartilagenous, soft tissures and air spaces.

7. A systematic method of examining the neck and its contents should be developed. By this means misinterpretations and even failures to interpretate will be greatly lessened.

8. The laryngologist and roentgenologist should cooperate here as in other fields. The former has detailed knowledge of the special anatomy, physiology and pathology of the region, while the latter has knowledge and experience about the x-ray and its application to the human body.

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EARLY PATHOLOGICAL LESIONS OF THE CERVIX AND ENDOMETRIUM

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Pathological lesions of the cervix and the endometrium become important in the field of clinical investigation because of their frequency, their liability to cause grave interference with the functions of the organs of reproduction and their challenge to the very life of the individual. While it is the lesions of a malignant character which contest the life of the individual, the benign lesions are also important because of their frequency as an almost symptomless disease, the part they play in functional interference and the fact that some benign lesions appear precancerous. That the detection and the eradication of the benign lesions of the cervix and endometrium is warranted cannot be emphasized too strongly. Every avenue of approach toward a better understanding of the origin and the nature of the lesions affecting these tissues must be studied and every available agent capable of aiding in early diagnosis and control must be instituted. Furthermore, it behooves us to be alert and keep abreast with all of the advances in the well-established standard methods of technique in diagnosis and treatment, and we must also endeavor to perfect any measure or special examination that may contribute in the slightest way to the further control of these lesions.

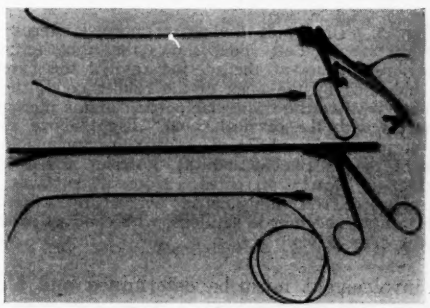

Fig. 1. Illustration shows instruments referred to in the text of this paper. From above downward, a biopsitome with flexible shaft over which is placed thin pure rubber tubing for insulation. The fenestrated jaws at the distal end represent the only point where cutting current may reach the patient. Biopsy specimens when exceedingly small are not damaged by electricity. Second instrument is a flexible tube with syringe attachments, side fenestration and at the distal end the ball may be used to occlude an open oviduct at the intramural portion which permits introduction of contrast material under pressure without escape into the oviduct. It is also used for other purposes. Third instrument is another type of biopsitome. After tissue has been grasped with the jaws of bakolite, the wire loop passes across from one jaw to the other, severing the specimen from the uterus with electrical cutting current. The entire instrument except the loop is insulated from the cutting current. The fourth instrument is designed for catheterizing the oviducts.

The differentiation of benign and malignant lesions is essentially the purpose of this paper. In the examination of every case, the time-honored methods which consist of a study of the history, the physical observations, including inspection, palpation, probe diagnosis, etc., must never be neglected. On the other hand, the hazards of clinical judgment and diagnosis based upon the findings elicited by these methods alone

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are frequently misleading and the patient's chance for health is jeopardized. To be able to say that a lesion is benign or malignant in clinical practice is not sufficient. The benign lesion must be properly classified. The extent

Fig. 2. Illustrates finding of normal uterus and cervical canal. Left above shows the right, left, and superior margins of the uterine cavity; the external os, indicated by the apex of the rubber cone; the internal os where the triangular portion of the uterogram connects with the cervical canal. Right above shows the corpus uteri in different position through manipulation of the instrument and the posterior and anterior surface is clearly presented. Note all surfaces and margins free from filling defect; oviducts open throughout; ostium abdominale patulous, with contrast material in the free pelvis.

of involvement must be determined and all of the possible complications that may exist revealed in order that the proper treatment may be instituted for their eradication. The malignant lesions also require very specific investigations, for the character of cancers occurring in these tissues vary greatly one from another. The type of the malignant growth, its activities, the mode of extension, and the plan of treatment depend very largely upon whether it arises in the endometrium or in the cervix. In general, those which arise in the endometrium are of low grade, almost always remain confined for some time within the corpus uteri, and under proper treatment respond well. In contrast, however, malignant neoplasms arising in the cervix uteri are almost always quite highly active in type, and as a consequence metastasize early, and local invasion is rapid. The accessibility of the cervix for diagnosis and treatment is therefore fortunate indeed. The fulminating character of the majority (85 per cent.) of the cervical malignancies accentuate the necessity for early diagnosis and determines largely the most desirable plan of treatment.

Highly active cellular changes which characterize the cervical cancers seem to creat radiosensitivity, and consequently correction through irradiation with radium and x-rays rather than radical surgical treatment has come to be quite universally accepted as the method of choice. It appears, however, that radical surgical procedures are effective and satisfactory when the lesion is found very early and there has been no invasion. On the other hand, irradiation is equally effective at this stage, and becomes far more efficient in controlling progress in those cases in which advanced stages render radical surgical removal inexpedient.

In all doubtful lesions of the cervix and endometrium a biopsy specimen must be secured for microscopic examination in order that a reliable diagnosis may be made promptly and positively. A negative report on a biopsy specimen often requires repetition in suspicious cases. The iodine test (Schiller) may help to locate precancerous or cancerous tissue, but it is seldom an essential aid in diagnosis. The site from which a biopsy specimen must be taken in order that a reliable pathological report may be secured is just as important when the lesion is located in the upper cervical canal or endometrium as it is when it is located in the accessible portion of the cervix. To obtain specimens of tissue in this manner, it is obvious that almost unsurmountable difficulties were encountered until the introduction of contrast material and x-rays were instituted as an aid in these examinations.

Fig. 3. Abnormal development of uterus and oviducts causing sterility.

Fig. 4. Multiple filling defect in uterogram indicating glandular hyperplasia with cystic polyp formation. The cardinal symptoms being menorrhagia and metrorrhagia.

Surgical curettage has for many years been the only method for obtaining the tissue specimens from which we could entertain a hope that microscopic diagnosis of a reliable character could be obtained. In spite of the dangers en-

countered, such as hemorrhage, the spread of a general sepsis, rupture of the uterus, generalized metastasis where malignant lesions were present, etc., it remained that the advantages seemed to outweigh all of these dangers or resort to unnecessary radical surgery, which was the only other recourse. Quoting Dr. James Ewing: "The routine curettage of the endometrium for fundus cancer must be held responsible for dissemination of tumor cells in a substantial proportion of cases. . ." Pathologists and clinicians alike

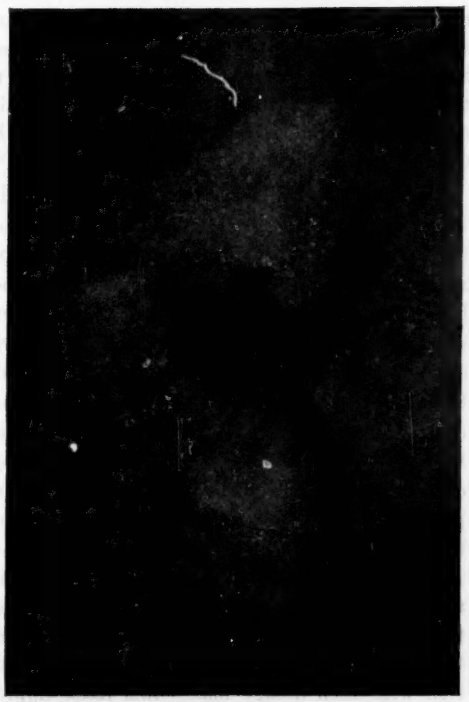

Fig. 5. This illustration shows typical defect in uterogram of corpus carcinoma.

have frequently had to face, with chagrin, the fact that the pathological report on tissue removed after a careful curettage of the endometrium and upper cervical canal has shown only necrotic tissue or other changes of an indefinite character, and later the presence of a malignant neplasm becomes apparent because unmistakable invasion has occurred.

A careful study of the defects which may be shown to be along the cervical canal and in the cavity of the corpus uteri with x-rays and contrast material becomes a very great aid in determining the presence of neoplastic and other lesions in these locations.

To replace the use of the curet in this work an instrument known as a biopsitome has been designed. With this instrument a biopsy specimen may be secured at any point along the cervical canal or the endometrium under the direction of the x-rays and the fluorescent screen from the site of a defect which has been located and studied radiologically. The biopsitome is so designed that a tissue at any location may be grasped and severed with an electrical cutting current in a manner which will reduce the hazards of the curet. Furthermore, repeated biopsies may be taken with the biopsitome from the same area or from several selected areas without inflicting damage to portions of the endometrium and servical mucosa in which no filling defects are found. After using instruments of this design over a period of several years in a fairly large series of cases covering a wide range of lesions affecting these tissues, it appears that the reliability of the microscopic reports is elevated and the liability of undesirable complications is exceedingly low.

In this connection it may also be mentioned that, under the guidance of x-rays and the fluorescent screen with variable amounts of contrast material within the endometrium, other electrosurgical procedures may be undertaken, e.g., oviducts stenosed at the intramural portion may be catheterized, the oviducts filled to variable distentions in the effort to open the ostium abdominale, thereby correcting sterility, etc. Further-

Fig. 6. Illustration shows neoplastic regression following adequate treatment by irradiation after twenty-four weeks.

more, the mucosa in the intramural portion of the oviducts may be destroyed by electrocoagulation, creating complete occlusion at this point and establishing sterility when it becomes desirable to avoid more radical surgical intervention. There are also other surgical procedures that may be likewise conducted.

Regression of neoplastic and other lesions following irradiation or other forms of treatment may now be observed with reliable accuracy long before such changes can be detected by any other method. Furthermore, defects caused by neoplasms may be determined in this manner before symptoms have developed which would give reasonable grounds for suspicion that such conditions exist. With these methods of diagnosis available it becomes apparent that important lesions may be detected early, their true character revealed through biopsitome specimens and the pathological report and the proper treatment planned and instituted at a time when it is most effective. Observing the progress of lesions without treatment, noting regression with treatment, the determination of adequate or inadequate treatment, as indicated by the presence of progression or regression, and finally the elimination of the hazards of the curet and radical pelvic surgery combine to create more reliable diagnoses, prognoses, and treatment.

FURTHER STUDIES IN THE TREATMENT OF ULCERATIVE COLITIS WITH ALUMINUM HYROXIDE AND KAOLIN

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In a previous study[1] of aluminum hydroxide and kaolin as an effective treatment for ulcerative colitis excellent results were reported. At the same time we were not unmindful of the fact that such success could not be obtained in all circumstances. In a fairly large series a few such instances have occurred.

The field of colloidal chemistry and physics has opened new chapters in medical knowledge. Protoplasm itself is in a colloidal state and thus a more comprehensive understanding of all colloids has become increasingly important. These studies are quite complex and confusing at the present time for they require considerable technical knowledge and their interpretation has not been uniform. This has resulted in wide speculation, often without proven merit, in the proper treatment of various disorders.

A great variety of substances exhibiting colloidal properties are now available for gastrointestinal disorders. Among these are charcoal, kaolin and aluminum hydroxide, as well as plant extracts which form colloids when mixed with water. Most of these are quite bland and act chiefly as adsorbents. Aluminum hydroxide differs from others in that it is amphoteric and somewhat astringent. Some adsorbents are most active in acid media, others in alkaline. Those most active in one medium may or may not show an irreversible affinity even though the reaction is changed, but this is only known to occur in the test tube. How far this holds true in the complexes of the digestive tract remains to be discovered.

The possibility of producing a nutritional deficiency by giving adsorbents orally has made us hesitate to give them over a considerable period of time. Small amounts for brief periods likely cause no appreciable harm. In a recent report[2] three dogs were given relatively large amounts of aluminum hydroxide cream with their food for five days without a significant change in the nitrogen and fat content of their feces. Emery[3] has discussed the pharmacology of gastrointestinal adsorbents at length, and pointed out this potential complication and questioned their usefulness in chronic disorders. Enormous amounts would be required to retain any activity in the colon after mixture with gastric and upper intestinal secretions. The additional danger of producing an intestinal obstruction with such dosage makes this route impractical in lesions of the lower intestine.

The advisability of giving such medication per rectum becomes readily apparent when treating ulcerative colitis. Larger amounts of active unchanged suspension are brought into direct contact with the lesion, and the possibility of disturbing an otherwise normal physiologic process is minimized.

A highly adsorptive property is necessary and a mild astringent action is equally useful. The aluminum hydroxide and kaolin mixture meets these requirements. Additional substance such as a lubricant is unnecessary and detracts from the original purpose in this type of therapy. Impaction formation is possible although un-

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likely if moderate care is taken as none of our series experienced this difficulty.

In our search for improvement in local treatment of ulceration in the colon two commonly used methods present themselves. Acriflavine irrigation, commonly used 1:3000, has a low toxicity and is highly antiseptic. A 15% bismuth subgallate suspension in mucilage of acacia is popular and of value. The bismuth subgallate is quite insoluble and considered as a protective, astringent and mild antiseptic. The adsorbent property of mucilage of acacia and the astringent action of bismuth subgallate appear to be its chief virtues.

Pure colloidal kaolin is highly adsorbent and bland, but tends to settle out of suspension into a firm mass, especially in the presence of an alkali. Aluminum hydroxide has great colloidal activity, does not settle out of suspension readily, forms a light viscid gel and aids in maintaining a neutral reaction. Neither of these substances have appreciable antiseptic action, but are useful for their ability to take up bacteria and toxins and eliminating them. The astringent property of aluminum hydroxide makes a combination of these two substances additionally desirable.

The large amount of mucus secreted in colitis may well be considered a defense mechanism which is aided by this therapy. Mucus is a highly active colloid which undoubtedly adsorbs much toxic material. An interesting observation is the prompt reduction in the amount of this substance even before the number of movements is reduced.

We find a mixture of three per cent pure aluminum hydroxide with 15% kaolin in colloidal suspension the most effective combination. Three to five ounces of this stock suspension with an equal amount of distilled water is usually given once daily. The retention should be given one hour or more after a small plain warm water cleansing enema and may be retained as long as there is no discomfort. In severe cases the retention may be expelled in one-half hour. After the acute stage subsides it is often retained for many hours or until the cleansing enema the following day. Both enema and retention are to be given at body temperature and under low pressure.

If the cleansing enema tends to cause irritation and the stools are of diarrhea type it is often omitted for a period of time and the retention given after the passage of a liquid stool. In the fulminating stage the retentions may be poorly tolerated making it advisable to give them on alternate days. When the stools become formed sedatives are discontinued. The retentions are continued until all evidence of inflammation has disappeared.

The majority of our cases responded satisfactorily to this form of management. All were hospitalized and put at bed rest. Frequent bland high caloric feedings, sufficient sedative to control pain or discomfort and an ample vitamin intake are essential.

Fresh stool and culture examinations were done routinely and one or more therapeutic antiamebic courses given to rule out parasitic infection. All dysentery agglutination tests done were negative. The usual foci of infection were sought and eliminated as far as possible.

Three of our cases lost tolerance to this type of treatment in severe recurrences, and a fourth did not tolerate retentions at any time. The first (Case 6) responded very well during her first attack, but one year later developed a severe sinus infection with an uncontrollable diarrhea and was ileostomized. The second (Case 12) continued in normal health after treatment until an amebic infection, contracted while on a trip to Mexico, was neglected and when seen some months later a multiple polyposis was present. The third (Case 9) ran a septic course for two months and cleared up when a phlebitis in the left leg initiated a recurrence with loss of tolerance to the retentions. The extensive destructive changes of the colon made his prognosis unfavorable. Our fourth patient (Case 1) was gravely ill, ran a septic temperature as high as 104° for seventy days and was unable at any time to retain rectal medication. She is temperature free at this time and gross blood has disappeared from the stools. Marked destructive changes of the colon are present and an ileostomy has been advised.

The uniformly good results of our first series were more than one could expect to maintain in treating any disease process.

It is not assumed that this preparation is a

specific for ulcerative colitis. We believe it a valuable addition to an already well-established treatment. Prolonged bed rest, frequent high caloric non-irritating feedings and adequate vitamins are of paramount importance. When permanent structural changes, such as cicatricial contractions and foreshortening are present a normal bowel physiology cannot be re-established, although much symptomatic relief may be obtained by careful management.

Case No.	Age	Sex	Weight	Onset and Course	Temperature	Blood
1.	23	F.	Min. 84 Max. 100	Diarrhea 4 mos. before treatment. Total time since onset 15 mos. Stormy course. Still confined to bed. Four stools per day now.	98° to 104.8° for 54 days. I chills. Since then low gr fever.	Hb. R.b.c. W.b.c
2.	8	M.	Min. 52 Max. 73	Frequent upper respiratory infections. Total time onset 1 yr. Moderate course. Passing normal stools now. Activities still limited.	Low grade fever.	Hb. R.b.c W.b.c.
3.	27	F.	Min. 83 Max. 107	Total time since onset 16 mos. Pregnant 7 mos. at onset. Normal movements now Active again. Smooth course.	Low grade fever.	Hb. R.b.c. W.b.c.
4.	60	M.	Min. 138	Total time since onset 13½ yrs. Frequent colds. 10-15 movements per day at start.	Low grade fever.	Hb. R.b.c. W.b.c.
5.	15	M.	Min 138 Max. 173	Total time since onset 15½ mos. Frequent sore throat prior to tonsillectomy at 5 yrs. Lost 25 pounds since onset.	Low grade fever.	Hb. R.b.c. W.b.c.
6	30	F.	Min. 126 Max. 90	Total time since onset 3¼ yrs. Diarrhea 1 yr. before treatment. Reacted well to retentions at first. Very stormy course. Ileostomized.	Septic. Up to 103.4° for weeks.	Hb. R.b.c. W.b.c.
7.	42	F.	Min. 128 Max. 147	Total times since onset 2½ yrs Lost 39 pounds. Intermittent course.	Low grade fever.	Hb. R.b.c. W.b.c.
8.	33	F.	Min. 120 Max. 131½	Total times since onset 5 yrs. Treatment 10 mos. Normal stools now.		Hb. R.b.c. W.b.c.
9.	23	M.	Min. 103 Max. 126	Total time since onset 2¼ yrs. Ten mos. before treatment. Stormy course throughout.	Septic. Up to 103° for days.	Hb. R.b.c. W.b.c.
10.	39	F.	Min. 100 Max. 180	Total time since onset 9½ yrs. Six yrs. before treatment.	Low grade fever.	Hb. R.b.c. W.b.c.
11.	24	M.	Min. 135 Max. 182	Total time since onset 7 yrs. Four yrs. before treatment. Invalid for 2 yrs. previous to retentions. Normal activities and weight now.	Low grade fever.	Hb. R.b.c. W.b.c.
12.	31	M.	Min. 146 Max. 167	Total time since onset 8 yrs. Five yrs. before treatment. Responded well to retentions but then developed amebic infection with polyposis and since then bedridden.	Low grade with occasional p riods of septic fever.	H.b. R.b.c. W.b.c.
13.	69	M.	No change	Total time since onset 2½ yrs. Three days before treatment. Followed suprapubic prostatectomy. Condition cleared up on five days' treatment. No recurrence.	Postoperative type.	Hb. R.b.c. W.b.c.
14.	36	F.	Min. 100 Max. 125	Total time since onset 8 yrs. Six yrs. before treatment. Had been confined to bed for three mos. with first attack. Normal activities now.	Low grade fever.	Hb. R.b.c. W.b.c.
15.	56	F.	Min. 75 Max. 90	Total time since onset 6 yrs. Five yrs. before treatment. Frequent severe respiratory infections. Normal activities now.	High, septic on admission. Lo grade after treatment started.	Hb. R.b.c. W.b.c.
16.	45	M.	Min. 161 Max. 174	Total time since onset 11 yrs. Total time since treatment 16 mos. Mild course. Normal activities now.	Normal.	Hb. R.b.c. W.b.c
17.	19	M.	Min. 124 Max. 180	Total time since onset 21 mos. Total time since treatment 20 mos. Mild course. Normal activities now.	Low grade fever.	Hb. R.b.c. W.b.c
18.	36	M.	Min. 145 Max. 158	Total time since onset 11 yrs. Total time since treatment 8 mos. Semi-invalid. Normal activities for past 2 mos.	Low grade fever.	Hb. R.b.c. W.b.c
19.	16	F.	Min. 87 Max. 116	Total time since onset 5 yrs. Total time since treatment 5 mos. Frequent small blood transfusions.	Septic to 103° for six weeks.	Hm. R.b.c. W.b.c
20.*	35	F.	Min. 70 Max. 110	Total time since onset 6 yrs. Total time since treatment 1 yr.	Low grade fever.	Hb. R.b.c W.b.
21.*	33	F.	Min. 95 Max. 120	Total time since onset 6 yrs. Total time before treatment 5 yrs. Stormy course. Up to 12 stools per day.	Septic. Up to 102.8° for on month.	Hb. R.b.c W.b.
22.*	37	M.	Min. 125 Max. 143	Total time since onset 1 yr. Total time before treatment 3 weeks. Mild course.	Low grade fever.	Hb. R.b.c W.b
23.*	37	M.	Aver. 200 Little change	Loose movements as long as he could remember. Rectal hemorrhage 5 yrs. ago. Total time since treatment 6 mos. Normal activities and working hard now.	Normal.	Hb. R.b. W.b
24.*	39	F.	Aver. 130 Little change	Total time since onset 18 yrs. Total time before treatment 17 yrs. Told she had ulceratve colitis 17 years ago.	Low grade fever.	Hb. R.b. W.b
25.*	31	M.	No change	Total time since onset 7 mos. Total time since treatment 6 mos.	Low grade fever.	Hb. R.b W.b

At this time 84% of our cases are enjoying usual activities and better health than they have experienced in years.

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Blood	Max.	Min.	X-Ray	Proctoscopic	Complications	Retentions
Hb.	64	33	Not done	Small proctoscope showed ulceration	Bullous impetigo Bartholinitis	Did not tolerate. Better on acriflavine
R.b.c.	4,100,000	2,400,000				
W.b.c	7,200	6,450				
Hb.	79	.....	Not done	1. Typical	None.	Well tolerated.
R.b.c	4,200,000	.....		2. Normal mucous membrane.		
W.b.c.	12,000	.....				
Hb.	82	68	Narrowing with loss of haustral markings in rectosig. and sigmoid.	1. Severe inflammation. Markedly narrowed.	None.	Well tolerated.
R.b.c.	4,500,000	3,820,000		2. Normal.		
W.b.c.	9,000	10,500				
Hb.	77	.....	Rectum and rectosigmoid narrowed+++	1. Severe inflammation.	None.	Well tolerated.
R.b.c.	4,150,000	.....		2. Recently reported in good health.		
W.b.c.	8,100	.....				
Hb.	90	76	Descending colon loss of haustral markings.	1. Typical.	None.	Well tolerated.
R.b.c.	5,150,000	4,200,000		2. Normal at 3 mos.		
W.b.c.	9,200	11,200				
Hb.	80	50	Descending colon narrowed.	1. Severe inflammation.	Arthritis Erythema nodosum; rectal fistula.	First good and hen no longer tolerated.
R.b.c.	4,200,000	3,000,000		2. Almost normal.		
W.b.c.	6,200	12,000		3. Very severe inflamtion.		
Hb.	90	70	Narrowing of rectosigmoid.	1. Severe diffuse ulceration.	None.	Well tolerated.
R.b.c.	4,300,000	4,000,000		2. Normal.		
W.b.c.	7,500	10,400				
Hb.	86	75	Rectum, rectosig. and descending colon. Narrowed and shortened.	1. Typical.	None.	Well tolerated.
R.b.c.	4,450,000	3,950,000		2. Well healed at 6 mos.		
W.b.c.	13,600	12,000				
Hb.	76	60	Lower half of colon narrowed.	Small proctoscope used. Typical appearance.	Thrombophlebitis.	Well tolerated at first, then poorly.
R.b.c.	4,100,000	3,750,000				
W.b.c.	7,400	12,800				
Hb.	88	70	Lower half of colon and rectum involved.	1. Typical.	None.	Well tolerated.
R.b.c.	4,830,000	4,100,000		2. Normal.		
W.b.c.	8,000	9,700				
Hb.	86	70	Slight narrowing and loss of haustral markings in sigmoid.	1. Typical.	None.	Well tolerated.
R.b.c.	4,850,000	4,100,000		2. Normal.		
W.b.c.	7,600	11,200				
H.b.	85	50	Marked constriction of entire colon except in cecum and ascending portion.	Typical with polypi during last 18 mos.	Polyposis.	Well tolerated at first, now not at all.
R.b.c.	4,000,000	3,900,000				
W.b.c.	7,200	11,000				
Hb.	70	.....	Not done.	1. Typical diffuse severe inflammation.	None.	Well tolerated.
R.b.c.	3,950,000	.....		2. Normal.		
W.b.c.	9,800	.....				
Hb.	87	63	Sigmoid and descending colon smooth margins. No narrowing.	1. Typical wih narrowing.	None.	Well tolerated.
R.b.c.	4,940,000	3,730,000		2. Normal.		
W.b.c.	8,700	12,600				
Hb.	85	60	Margins of sigmoid and descending colon smooth.	1. Typical.	None.	Well tolerated.
R.b.c.	4,450,000	3,370,000		2. Normal.		
W.b.c.	7,700	8,400				
Hb.	84	72	Not done.	1. Typical.	None.	Well tolerated.
R.b.c.	4,800,000	4,000,000		2. Well healed.		
W.b.c.	8,750	10,600				
Hb.	88	75	Not done.	1. Typical.	None.	Well tolerated.
R.b.c.	4,830,000	4,000,000		2. Healed.		
W.b.c.	7,200	10,100				
Hb.	84	70	Narrowing and loss of haustral markings below splenic flex.	1. Typical.	None.	Well tolerated.
R.b.c.	4,440,000	3,800,000		2. Well healed.		
W.b.c.	9,200	11,000				
Hm.	76	60	Narrowing and loss of haustral markings below splenic flex.	1. Typical.	Arthritis.	Well tolerated.
R.b.c.	4,340,000	3,300,000		2. Good healing.		
W.b.c.	9,800	16,000				
Hb.	85	45	Narrowing with loss haustral markings beyond mid-transverse colon.	1. Typical.	None.	Well tolerated.
R.b.c.	4,000,000	3,360,000		2. Normal.		
W.b.c.	14,200	7,600				
Hb.	75	40	Not done.	1. Typical.	None.	Well tolerated.
R.b.c.	4,100,000	2,000,000		2. Normal.		
W.b.c.	11,400	12,900				
Hb.	95	.....	Not done.	1. Moderate inflammation.	None.	Well tolerated.
R.b.c.	5,000,000	.....		2. Normal.		
W.b.c.	8,200	.....				
Hb.	85	.....	Narrowing with absence of haustral markings in sigmoid and descending colon.	1. Typical.	None.	Well tolerated.
R.b.c.	5,330,000	.....		2. Normal.		
W.b.c.	11,250	.....				
Hb.	75	.....	Narrowing with a loss of haustral markings in lower third des. colon.	1. Typical, some narrowing.	None.	Well tolerated.
R.b.c.	4,490,000	.....		2. Normal.		
W.b.c.	12,900	.....				
Hb.	75	.....	Not done.	1. Typical acute inflammation with punctate hemorrhagic areas.	None.	Well tolerated.
R.b.c.	4,380,000	.....		2. Normal.		
W.b.c.	9,850	.....				

THE VALUE OF ONE INJECTION OF ALUM PRECIPITATED TOXOID IN CONTROLLING DIPHTHERIA

C. H. Benning, M.D., C.P.H.

ROYAL OAK, MICH.

It was the practice in Peoria, Illinois, to use at least two injections of alum precipitated toxoid or fluid toxoid as an immunizing agent against diphtheria up to the year 1937. At that time the author of this monograph decided to introduce the use of one injection of alum precipitated toxoid as the sole measure of immunizing large numbers of children.

The program of mass inoculation of school children was undertaken after due deliberation with the public relations committee of the Peoria City Medical Society. The reason for mass immunization was that, prior to 1936, diphtheria has been extremely prevalent in Peoria. In 1935 one of the worst epidemics of diphtheria was recorded in this city. One hundred and eighteen cases of diphtheria had been reported to the City Health Department and fourteen deaths had occurred. Thirteen of the fourteen deaths were in children. Every effort had been made in prior years to persuade parents to take their children to the family physician for preventive treatments against this dread disease of childhood. Unfortunately, the public did not respond to the invitation and diphtheria became an endemic condition with frequent exacerbations to epidemic Form.

The means of approach to the problem by the director of health of the schools was:

1. Frequent newspaper articles on the danger of the disease.

2. The necessity for immediate inoculation against the disease.

3. A survey of all the grade schools to discover the number of unprotected children.

A mimeographed letter was sent to the parents of all children in the public schools up to and including the fifth grade requesting their diphtheria and smallpox immunization status. These, when returned, were sorted and tabulated as to previous inoculation, refusal or willingness to go to the family physician for the necessary treatments, and finally, those who stated they could not afford to pay the family physician his regular fee. This last group were sent a printed blank on which the parents requested inoculation for their children against diphtheria and signed their names under a statement clearly stating their inability to pay the physician's regular fee.

One thousand six hundred and ninety-one children in the twenty-one grade schools were given the one injection of alum precipitated toxoid as supplied through the State Health Department at Springfield. No untoward reactions of a serious nature occurred as far as could be ascertained by the school health department.

The method of cleansing the arm, used prior to injection of toxoid was that recommended by Mustard (Rural Health Practice, page 327. Harry S. Mustard, 1936). Plain alcohol is recommended and it is totally unnecessary to use any other antiseptic, according to my observation for many years. The injection should be made subcutaneously and not intramuscularly. Small sterile abscesses are liable to occur if the toxoid is injected into the muscular tissue. The injection was made on the outer side of the upper arm as being most convenient and allowing the operator a firm grasp of the child's arm, which helps to prevent the danger of a needle breaking off in the tissues.

A labor-saving device for sterilizing needles in a wholesale way was used and is on exhibit here if you desire to inspect it. Fifty or more needles are easily sterilized at one time and are less subject to contamination after sterilization.

Each child had to present a blank signed by the parents at the time of inoculation so as to prevent any unexpected disagreeableness from a parent whose child might develop a temporary sore arm. The number of severe reactions following the injection of alum precipitated toxoid was remarkably small and limited to one or two sterile abscesses. No cases of anaphalaxis were recorded.

According to the figures of Park (Public Health and Hygiene, Chapter IV, page 67, 1928) 81.5% of all deaths from diphtheria in New York occur in children under five years of age, and in the age-group five to nine—17%. So that it is permissible to axiomize that concentration on children from one to nine years of age, for diphtheria prevention will reduce materially the 98.5% mortality in this age-group. The morbidity of this disease is stated to be 65.5% for ages one to nine. These figures are taken from the White House Conference Reports, Volume

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II-B, and refer to the Massachusetts experience for the years 1920 to 1929.

Boyd, in his latest book, "Preventive Medicine," published in 1936, page 97, says "Current practice sanctions the administration of a single injection of 1 cc. of alum precipitated toxoid to children up to six years of age. In older children and adults a second dose of the same amount may be given one week later. It has been found that, in the case of children under six, 90% of Schick reactions become negative within three weeks of inoculation."

Back in June, 1935, an article appeared in the A. P. H. A. Journal headed "Recommended Procedures for Diphtheria Immunization." The Sub-Committee on Evaluation of Administrative Practices of the Committee on Administrative Practice of the A. P. H. A. offers the following as representing the best in immunizing against diphtheria:

Children from six months to six years—one injection of 1 cc. of alum precipitated toxoid.

For older children—T A T in three doses.

Since the publication of this article I have had the pleasure of talking to several members of the Sub-Committee on Diphtheria. It is the consensus of their opinions that 1 cc. of alum precipitated toxoid is sufficient to curtail and practically wipe out diphtheria in any city if given to children of one to nine years of age consistently. The toxoid should be of a high antigenic potency, at least as high as that required by the National Institute of Health. 80% of guinea-pigs given it must be sufficiently immunized in ten weeks so as not to succumb to five M.L.D.'s of diphtheria toxin within ten days. Public health workers ordinarily say about 90% to 95% of children given toxoid are immune for life. This is probably true, but the permanence of the immunity seems not entirely the result of the toxoid, other factors playing their part.

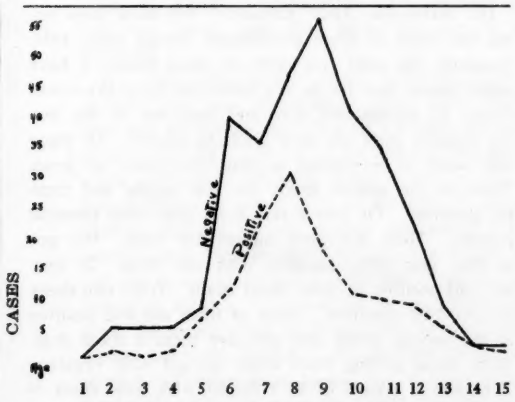

Chart 1. Schick reactions in 425 children after one injection of alum precipitates toxoid.
Negative, 304; per cent of total..... 71.53
Positive, 121; per cent of total..... 28.47

In my experience the statement that 90-95% of children six years of age and under are made immune by one injection of alum precipitated toxoid does not hold true, but I have found 70-80% of children in this age-group to be Schick negative six months to one year after inoculation. Park's figures of 90-95% negative Schicks were read three to four weeks after immunization. There is no doubt that a proportion of these negatives would become positive again within six to twelve months. However, it is my opinion that even with 70-80% of negatives at the end of one year in 50 per cent of the school children diphtheria will be an extremely rare disease. If this immunizing procedure is carried out systematically it is more than probable that diphtheria will practically disappear from a community.

In the Royal Oak District of the Oakland County Health Department, which comprises 80,000 inhabitants, two doses of fluid toxoid were given as routine during the years 1933 and 1934. Late in 1934, and as a routine procedure since that period, one injection of alum precipitated toxoid was given. The number of cases of diphtheria recorded in that period is herewith presented:

1933—5 cases.
1934—3 cases.
1935—1 case.
1936—3 cases.
1937—1 case.

It is apparent that the change from fluid toxoid to alum precipitated toxoid made no difference if judged by the number of cases of diphtheria in the area studied.

Let us now turn to the figures obtained in the Peoria, Illinois, study.

Five schools in which 596 pupils had received toxoid one year ago were chosen for the check-up. A total of 1691 children in the twenty-one grade schools had received the one injection of alum precipitated toxoid. This toxoid was the

standard product of the State Health Department. The Schick test was given to 434 pupils of the 596 who brought consent slips from their parents. 425 returned for the Schick reading and nine were absent for some reason or other. Three hundred and four, or 71.53% of the total of 425 Schicked were negative, and 121, or 28.47% were positive. It is quite possible that the percentage of negatives would have increased if controls had been used. The value of control tests would have ruled out a certain percentage of pseudo-positives. As far as we could ascertain, none of the children in this group given toxoid or Schicked had ever been previously inoculated.

With almost 72% of children ranging in age from one year to fifteen years, Schick negative after one year, it is reasonable to expect that, as the years go by with the routine use of one injection of alum precipitated toxoid, the percentage of positives will decrease. Inoculation of the pre-school group is the most important phase of diphtheria immunization, and as can be seen on the attached graph, the number of children five years of age and under being brought to the clinic was relatively small—31 or only 7.3% of the total number. The procedure in reading the Schicks was to call all doubtful reactions positive so that there could be no possibility of erring on the wrong side of the ledger.

The Commissioner of Health of Peoria, who assisted me both with the inoculation of the alum precipitated toxoid and the giving and reading of Schicks, feels, I believe, that one injection of the alum precipitated toxoid is a useful and satisfactory method of controlling the spread of diphtheria among children. I might further add that it is my belief that the giving of the Schick is not a public health measure. Let me qualify this remark by saying that it is useful in just such a study as this to ascertain the percentage of immunity obtained solely as an academic point. If parents desire to find out the results of the inoculation the children can be Schicked at the private physician's office or in a clinic, but not as a routine procedure in the schools.

The method of giving the Schick test was routine. The flexor surface of the forearm was cleansed in its middle third with rubbing alcohol and allowed to dry, then .1 to .2 of a cc. of Schick material was injected intracutaneously. It is most important that the injection is intracutaneously and not subcutaneously. A 25-gauge needle and tuberculin syringe were used. The Schick test was read on the fourth day after injection at which time the reaction has usually reached its maximum intensity.

SUMMARY:

Four hundred and twenty-five children were Schicked one year after receiving one injection of alum precipitated toxoid. Three hundred and four, or 71.53% were negative and 121, or 28.47% were positive. It is my belief that the percentage of negatives obtained after the one injection of toxoid is satisfactory, and that one injection of alum precipitated toxoid is a safe procedure to follow in immunizing a large group of children one to nine years of age.

CONCLUSION:

The use of one injection of alum precipitated toxoid as a method of immunization against diphtheria has been in use by various health agencies for some time throughout the country, with excellent results. Its use in Peoria if continued will undoubtedly be as beneficial. The obvious economy in time is real, and parents will usually attend a clinic or doctor's office for one injection of a serum without much urging. This is an added advantage to be given serious consideration.

111 South Troy Street

DISCUSSION

Dr. Arlington Ailes, LaSalle: We have been using one dose of alum precipitated toxoid since 1935. Formerly we used two doses of fluid toxin. I have some figures here for it. We immunize in our pre-school clinics by giving one dose and then we do not test the children until the first grade of school. All those who want to be treated in that first grade we treat. Then in the second grade we test again, and treat the positives. Of course this is all done with parental consent. Here are some figures for 1936. We got in that year 58% negative with one dose. If they are still positive we treat them again. With two doses we got 79% negative. Some of them are still positive in the second grade and we give them a third dose. With those getting three doses we got 85% negative. We have a record of 28 children with four doses in whom we got 86% negative.

Dr. Winston H. Tucker, Evanston: One year you give one dose and Schick them the next year, and one dose more and Schick them the next year?

Dr. Ailes: Yes. There is always the interval of

one year between the Schicking, and sometimes there is an interval as long as five years. We do not give two doses three or four weeks apart, but one dose at a time, that is, if the child is given a dose at nine months of age in our infants' welfare clinic, it is not tested until it goes to school, which is six years of age, or in the parochial school, five years of age. Out of all those treated in this manner, with one, two and three doses we got a grand total of 79% negative. In checking all the children we finally got 67% negative and 80% have received one or more doses of the toxoid.

For 1937, we had 216 children tested without any treatment and 7.5% were negative; 234 had received one dose and 70% became negative; 220 had received two doses and 75% became negative; 69 had received three doses and 93% became negative. We have three who received four doses and only 67% were negative, and two received five doses and 50% were negative. After they receive three doses it does not seem to make much difference if they receive the fourth, fifth or sixth dose. A few years ago we had some that received six doses and they did not seem to be capable of becoming immune. This year, 1937, of all the children treated we had 75% to become negative. Of course we keep at them. If they do not become negative with the first dose, we test and treat again until they receive a third dose, after which they are tested again, but not usually tested further.

Dr. Tucker: Have you had a case of diphtheria in those that had the alum precipitated toxoid?

Dr. Ailes: We have not to my knowledge had a case of diphtheria in the children we have treated, even with one dose. We had one death last year from diphtheria but the child had received no treatments whatever. We have had four or five cases of diphtheria but most of them were in adults.

Dr. G. Koehler, Springfield: The children in the last two years, were they pre-school age or school children?

Dr. Ailes: These were school children. Those who received two and three doses were school children, first and second grades. We do not treat them in the third grade any more. I might add that we give this alum precipitated toxoid in doses of 1½ c.c. and never had a sterile or other kind of abscess. I might say further that we do not change our needles, but do alterate with two syringes, keeping the needle of the one not in use immersed in a pledget of cotton sopping wet with alcohol. We sterilize in the beginning and wipe the needle after each insertion on the pledget of cotton wet with alcohol. We sterilize the arm with alcohol. I have been giving the various tests and treatments, including many thousands, for several years, and never had a sterile abscess nor an infection.

Dr. Winston H. Tucker, Evanston: I do not use alum precipitated toxoid because I do not feel that one injection of this product confers a satisfactory degree of immunity agains diphtheria. While on the staff of the State Department of Health I made a comparative study of the value of one injection of alum precipitated toxoid as contrasted to three injections of plain dihptheria toxoid, and found that one dose of alum precipitated toxoid resulted in negative Schick tests in 72% of the children six months later, whereas 92% of the children who had received three doses of plain diphtheria toxoid were Schick negative after a comparable period. From an administrative point of view I appreciate the convenience of a single injection of alum precipitated toxoid, but in communities carrying out well-organized public health programs it is not difficult to have children return at three week intervals for three injections of plain toxoid. Following three injections of plain toxoid the level of circulating antitoxin is raised to a much higher level than is obtained following one injection of alum toxoid. Fraser and his co-workers have demonstrated this fact by making blood titrations for diphtheria antitoxin.

Accordingly, irrespective of the recommendation of the subcommittee on administrative practice of the American Public Health Association, I do not feel that 71.53% negative Schick tests, as obtained by Dr. Benning with one dose of alum toxoid in Peoria, is adequate to protect a community against this dreaded disease. It is true that the percentage of negative Schicks obtained by Dr. Benning will prevent a wide-spread epidemic of diphtheria, but deaths from diphtheria will occur in the almost 30% of the child population who are not protected. It is my feeling that it is the responsibility of the Health Officer in every community to make every effort to protect a high percentage of the child population against diphtheria, and in Evanston our diphtheria immunization program results in such protection in 90% of grade school children. Excellent cooperation is obtained from practicing physicians in our community, and a large percentage of infants are immunized against diphtheria between the ages of 9 and 12 months, and the same is true in children of pre-school age. As for myself, I intend to continue to employ and recommend to Health Officers that three injections of 1 c.c. each of plain diphtheria toxoid be used in diphtheria immunization with intervals of three weeks intervening, and a follow-up Schick test six months after the last injection. Inasmuch as the chief value claimed for alum toxoid is that only one injection is necessary, I have discarded this product entirely in favor of three injections of plain dihptheria toxoid.

Dr. Sandor Horwitz, Peoria: Last year we had a diphtheria campaign in East Peoria. We gave the Schick test to 465 children above the age of ten with about 60% positives. After the Schick test was given to these children above the age of ten we inaugurated a campaign and inoculated about 560 children. All of those 560 received two inoculations of alum precipitate. The Schick test resulted in over 98% negatives.

Dr. Tucker: How long after your injection did you do one of Schick?

Dr. Horwitz: We did it six months apart.

Dr. W. W. Bauer, Chicago: I would like to record my disagreement, since that seems to be in order, with the statement that the Schick test subsequent to immunization is not a public health measure. In my judgment it very definitely is a public health measure and these are my reasons: In the first place, I think the majority of parents want to know what the results have been, not only for the community but for their own family, and I think they are entitled to know it. For another thing, you have a percentage of negatives in your series where you do Schick tests for the purposes of statistics and research. You have a percentage of positives there and, presumably, those positives, if our Schick test is any good at all, are your nearest approach to failure, if not actual failure, in immunization. If you get diphtheria reported in any cases subsequent to immunization you will get it in those positives and, for your own protection, it seems to me that as health officers you want to have a defense in your records to show that you have made Schick tests and that you have a record not only of the number of children presumably immunized but of the actual children who were Schick negative as the result of the immunization. So, I think very definitely that the health department has an obligation to make a checkup Schick test available, even though we have long since abandoned the idea of doing a preliminary Schick and immunizing only positives.

Dr. Benning, in closing: I am very glad my talk brought out some differences of opinion because it is only through differences of opinion that we progress. On the value of the toxoid I did not include the large bibliography. I have such a bibliography with me from not only this country but Europe in the use of alum precipitated toxoid, and I think it is the general opinion today that alum precipitated toxoid is superior to the older product. The State of New York, one of the pioneer states in diphtheria immunization, is using one injection of alum precipitated toxoid at the present time and they find it of value in controlling diphtheria. So is the state of Michigan, and I think several other states which are backing such a practice at the present time. So much for that.

As to the value of the Schick test as a public health measure, we as public health men, I believe, are interested in groups, not individuals. We are to see that we reduce diphtheria to a minimum. If the parent wishes to find out definitely whether his child is immunized I think he should go to some clinic where they take them in mass lots. I think you will find that I agree with Mustard in his latest book on public health in this statement of mine.

Again, with regard to the Schick test, there are on record cases with negative Schicks developing diphtheria and, when you give a certificate of a negative Schick telling that parent that his child is absolutely protected against diphtheria and that child does get diphtheria, you have an awful lot of explaining to do, and it has happened. There are cases on record. That is all.

DIARRHEA AS AN INSTITUTIONAL PROBLEM*

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Diarrhea is a symptom-complex of many infectious, as well as organic and functional disturbances to which man is heir. It is especially prevalent in institutions housing large numbers of individuals, and presents an interesting, sometimes confusing, and very often menacing problem. This paper concerns a study of the etiology, diagnosis, and management of 1351 cases of diarrhea encountered in the Elgin State Hospital during the past three years (See Chart 1). Among

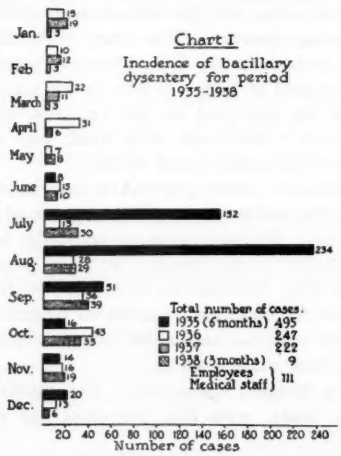

CHART I.

The distribution of new cases of bacillary dysentery over a period of nearly three years showing the peak in July and August of 1935, and a rapid diminution to an insignificant number in 1938.

those afflicted were physicians, nurses, employees, members of their families, resident and newly admitted patients, collectively representing a fairly well-balanced cross section of the entire

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population of about 5200. The greatest number of cases were observed the first year during an epidemic of bacillary dysentery. Subsequently, as a result of measures instituted for its control, the number of reported diarrhea cases diminished perceptibly.

Diarrhea may be defined as a conditon resulting from either extrinsic or intrinsic factors producing an abnormally frequent evacuation of liquid stools. Since the term is applied only as a symptom denoting the passage of liquid stools, it not only embodies those forms due to disease of the gastrointestinal tract, but is also indicative of conditions arising outside of this tract. It may occur even though there is no pathological change in the wall of the bowel itself. There are three general conditions capable of producing this symptom: 1. Toxic states; 2. Partial mechanical obstructions; and, 3. Functional disturbances of the nervous system.

In toxic states the stimulation of the bowel by irritating substances causes the stool to be rapidly carried into the distal colon and expelled. Absorption is markedly diminished. A concomittant transudation of fluids from the blood stream and an increased activity of the mucus-forming glands considerably increases the fluid content of the stool. In addition, as a result of the irritation or toxemia there may be marked changes in the pathogenic activity of the innumerable microorganisms normal to the large bowel, due either to lowered resistance of the host or the ingestion of a virulent organism. Considerable pus is formed which together with the exudation of blood and serum from the inflamed and ulcerated mucous membrane serves to increase the volume and create the essential characteristic stool of the acute bowel.

In partial obstruction, the peristalsic action is compensatory. The bowel, partially obstructed by growths, foreign bodies, strictures, edema, with or without inflammation and ulceration, attempts to rid itself of its contents by forceful, and often painful, movements. Only liquid portions are capable of being expelled, and, as a result, the frequency with which this process is repeated is directly proportional to the size of the obstruction and the amount of fecal contents.

Affections of the central nervous system may, and do adversely influence the function of the intestinal tract. Whether the stimulation be of glandular, allergic, organic or of extraneous origin, such as highly emotional states, excitement, and fright, it is accompanied by an accentuated activity and peristalsis of the intestinal tract due to increased excitability of the nerves of the intestine itself. There is literally a pouring out of mucus which may simulate a diarrhea, especially when it mixes with and tends to dilute the stool. It is self-limited and does not produce changes except an occasional puffiness and a non-inflammatory edema of the mucosa.

Diarrhea may be acute or chronic depending upon the cause and the duration of the symptoms.

ETIOLOGIC FACTORS

The greatest number of cases were acute (Chart 2). 1075 were caused by bacillary dysentery, which we shall discuss in detail; 130 by gastrointestinal upset; 66 by cathartics; 30 by fecal impactions, and 2 by paratyphoid (salmonella morgani). An impressively small percentage (3.6 of the 1351 cases) were chronic in character. In a detailed study of 334 cases of bacillary dysentery it was found that in 92% the symptoms persisted for from four days to eight weeks, and 8% from eight weeks to two years. However, were we to include all those whose symptoms continued unabated and who upon repeated sigmoidscopic examination exhibited findings of a chronic infection, the percentage would be increased to 17.7. Nevertheless, this was not done, and all cases were omitted who after two years

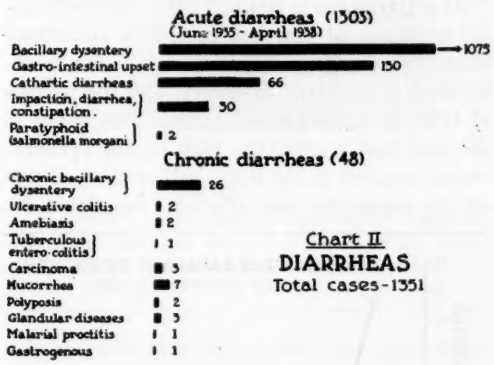

CHART II.

The preponderance of acute over chronic diarrhea in the ratio of 27 to 1 is shown. Bacillary dysentery accounted for 81% of the cases; fourteen other functional and organic diseases for the balance of 19%.

did not recur or display evidence of a bowel involvement. This does not, however, by any means preclude the possibility of a recurrence or of a development of chronic ulcerative colitis. Therefore, twenty-six cases were diagnosed as chronic bacillary dysentery. They exhibited lesions typically characteristic of chronic ulcerative colitis, and identical with the pathological changes noted in the bowel of two newly admitted patients whose history and findings suggested a diagnosis of idiopathic non-specific ulcerative colitis. Of the remaining twenty-two, one was due to tuberculosis, two to amebiasis, two to polyposis, three to carcinoma, seven to mucorrhea (mucous colitis), one to achlorhydria, two to hyperthyroidism and one to diabetes mellitus. A paretic receiving malarial treatment developed severe proctitis with diarrhea.

At a glance one is struck by the disproportionate incidence of diarrhea caused by conditions other than bacillary dysentery. 81% can be attributed to bacillary dysentery, and the balance of 19% to fourteen other causes. This is due to the fact that during the peak of the epidemic which occurred in the latter half of 1935, 10.9% of the population was affected (See Chart 3).

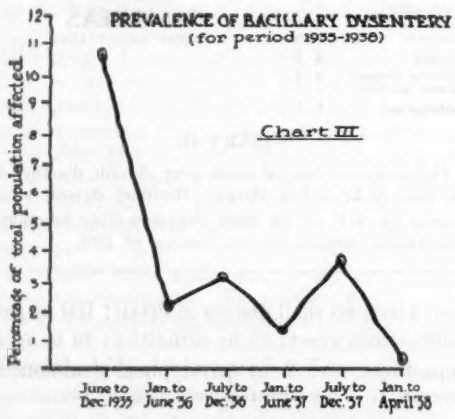

CHART III.

This graph depicts the percentage of all the inhabitants involved in this epidemic; the sudden drop in prevalence in the first six months, a somewhat stationary period of a year and a half and then another rapid reduction to less than .2 of 1% of the total population.

By the first of the year 1936 there was a drop to 2% in the prevalence of this disease, which, with the continued employment of the Elgin plan of control has gradually declined, so that in the first three months of 1938 we have observed only nine cases, amounting to 0.2%. It is therefore apparent that the major problem is bacillary dysentery, and that when this is properly controlled diarrhea becomes a minor issue. The usual periodic inspection of water and milk supply is insufficient as shown by the sudden and widespread outbreak in this institution where such inspection has long been routine. Complete cooperation is necessary and every suspicious case of gastrointestinal disturbance should be reported, examined and properly controlled. Then, and only then, can the situation be kept in hand at all times, and the possibilities of a serious outbreak can be minimized or entirely prevented. It is really amazing that this disease of high mortality and morbidity should not be as vigorously controlled as any other of a communicable nature.

DIAGNOSTIC APPROACH

The usual physical, cultural, serological and biopsy methods were employed but thorough and oft repeated sigmoidoscopic examinations enabled us to make an early diagnosis, to differentiate the dysenteric from the non-dysenteric lesions, to determine other causes for diarrhea (if within the reach of the scope) and to take specimens for culture and study. This procedure was exceedingly advantageous in facilitating the examination of large numbers of individuals quickly and efficiently, thereby aiding in the process of elimination and of control of the epidemic. Although most authors have cautioned against the use of a sigmoidoscope in an acutely inflamed bowel because of the dangers of trauma or perforation, we find that the proper and skillful use of a well-illuminated instrument of large caliber is not only not dangerous or detrimental but is indispensable. It is also quite essential to inflate the bowel to its full extent for better visualization of the exposed mucosa. This is particularly imperative in mild cases. No adverse effects can be produced by air except possibly a temporary cramp and discomfort, which is insignificant when compared to the advantages gained by direct examination of the tissues involved. Time does not permit even a brief discussion of the differential diagnosis in our series of cases. Most important is a detailed descriptive account of bacillary dysentery from a cultural, serological and sigmoidoscopic viewpoint and its management.

DIAGNOSIS OF BACILLARY DYSENTERY

The diagnosis of bacillary dysentery presents a difficult and controversial problem. The clinical manifestations may not correspond at all to the degree of mucosal involvement. A patient may be completely prostrated and yet the bowel be only mildly affected. On the other hand, the reverse may be true, and the patient makes no complaint at all despite an ulcerated mucosa.

The value of agglutination tests has been far overestimated. No specific agglutination reaction can be regarded as being diagnostic, no matter what the titre may be. In our opinion, and this is based upon a study of over 3500 serological tests performed upon dysenteric and non-dysenteric patients, it is simply a confirmatory test.

The cultivation and isolation of the offending organism is exceedingly difficult. More than 2500 specimens were taken in this series, 400 being immediately cultured, and the balance twelve to twenty-four hours later; but only ½ to 1% were found to be positive for shigella paradysenteriae of Flexner. Significant is the fact that a positive culture could never be obtained a second time in the same patient despite repeated cultures; that there was no definite lapse of time between the onset and the acquisition of a positive culture; and that the objective findings were identical in all cases, varying only in degree. A positive culture for bacillary dysentery definitely clinches the diagnosis, but a negative culture, even when repeated, in the presence of a characteristic proctoscopic and clinical picture of a bacillary infection, does not, by any means, exclude the diagnosis of this disease. Parenthetically, we might add, that in another series of cases, not in this institution, a decidedly higher percentage of positive cultures were obtained with the use of an entirely different medium. Does this not suggest that the means of cultivating and isolating the organism is at fault?

Rogers and Megaw[1] in their excellent book on tropical medicine state that both the gross and microscopic changes in the bowel are quite distinctive in bacillary dysentery. Felsen[2] also states that in the acute stage of bacillary dysentery the rectosigmoid is always involved, despite the fact that some patients do not complain or are not cognizant of the disease. We have performed more than 5416 sigmoidoscopic examinations upon diarhea and non-diarrhea cases in this institution alone, making comparative studies of varying conditions and diseases, in an effort to determine whether or not bacillary dysentery can be diagnosed by direct visualization. In no other condition involving the rectum and sigmoid, excepting perhaps amebiasis, was the appearance of the mucosa similar to that of bacillary dysentery. The changes in the mucosa are characteristic and comparable as a diagnostic feature to the skin and mucous membrane changes in certain exanthematous diseases.

There are four distinct stages observed sigmoidoscopically in bacillary dysentery; the mild, moderate, intense and ulcerated (See Chart 4).

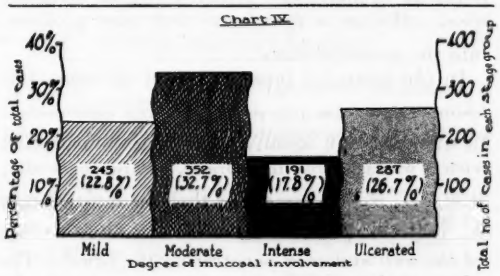

CHART IV.

An intensive and repeated sigmoidoscopic study revealed that there are changes produced in the bowel which may be considered distinctly pathognomonic of bacillary dysentery.

In *the mild type*, 22.8% of all the cases, there is a diffuse hyperemia of the mucosa which should not be confused with a simple congestion. This is often observed in the transitional stage of the disease and has led us to believe as previously reported[3] that the healing process begins at the distal end of the bowel. On the other hand we have consistently noted that the hyperemic changes would gradually spread from above downwards. This phenomenon has been also observed in the chronic cases. However, it is in this type of case that an error may be committed as to diagnosis, but in the presence of an unaccounted-for foul liquid stool the patient should be carefully studied for at least forty-eight hours to determine the nature of the malady.

The *moderate hyperemic types* account for about 32.7% of the cases observed. Here there is a moderately diffuse inflammation, dull to bright red, and thickening of the mucosa, causing a complete obliteration of the network of blood vessels. The normal structures are somewhat

affected, and the valves slightly thickened, the lumen being filled with liquid stool mixed with mucopurulent exudate and often blood. In this type the inflammatory process does not penetrate deeper than the mucosa.

The intense type has been encountered in 17.8% of the cases. The mucosa is intensely inflamed, from a bright to a purplish red, extremely edematous, the normal structures being completely obliterated and the lumen proportionately reduced in diameter. Not only is the mucosa involved but the entire wall of the bowel. Areas of petechial hemmorhages may be seen and the mucosa is covered with liquid or dried mucopurulent exudate, and either frank or streaked blood. Within a few hours this may progress into the ulcerated stage.

In *the ulcerated type, 26.7% of all cases, the* lesions vary from pin point to many centimeters in diameter, are usually superficial, and covered with a whitish gray membrane. Parenthetically, it may be well to remember that these ulcers may be deep and penetrating, involving all the coats of the wall and even penetrating the bowel. The edges of these ulcers are neither prominent, elevated, nor more inflamed than the surrounding mucosa which characteristics differentiate them from the amebic ulcers. However, one does not always see an intensely inflamed mucosa in conjunction with ulcers; it may be only mildly or moderately hyperemic, but is always hyperemic. The lumen may be filled with a foul liquid stool mixed with mucopurulent exudate and blood, sometimes forming a long thick dirty gray sheet, tissue-like in consistency. More than occasionally we have observed a perfectly normal stool in a moderately hyperemic and ulcerated bowel in individuals who did not even know that they had ulcerative colitis of bacillary origin.

Of those who survive about 92% recover completely, the remainder develop chronic bacillary dysentery. The findings conform to the description aforementioned except that the continuous or repeated infections produce permanent and damaging changes in the bowel wall, quite comparable to our conception of the pathology in chronic ulcerative colitis and terminal ileitis.

The average mortality for the period has been 14%, the highest percentage occurring in 1935. Necropsy was performed upon nearly 30% of those who expired and, excluding an occasional case, the pathological involvement of the small (distal portion of ileum) and large bowel ranged from mild hyperemia of the mucosa to thickening and destruction of normal tissues of the entire wall by inflammation, ulceration and necrosis, with pseudopolypoid changes and granulomata. In two instances a penetrating ulcer with perforation was found in the cecum and in two more, specimens were obtained of typical regional ileitis and colitis with skip areas described by Crohn[4] and by Felsen.[2]

Only one-half of 1% were positive for shigella paradysenteriae of Flexner but the mucosal pictures in both the negative and positive cases were strikingly identical.

MANAGEMENT

The American Public Health Association[5] has suggested that groups of cases of acute diarrheal disorder should always be reported to the health officer at once, even in the absence of exact determination of the nature and origin of the disease. Rogers and Megaw[1] urge the importance of an immediate diagnosis as a means of preventing the spread of the disease and state that a positive culture cannot be obtained early enough to be of distinct advantage. Before embarking upon any plan for the eradication of this disease it is imperative to recognize the grave potentialities of diarrhea, especially in institutionalized patients. To procrastinate until this disease becomes endemic, or worse, epidemic, is folly.

The management of diarrhea evolved at the Elgin State Hospital (Chart V) which might well be designated as the "Elgin Plan" consists of:

1. Periodic inspection of the water, milk and food supply.

2. Installation of properly fitting screens and other devices for the destruction and control of flies.

3. Careful supervision of all patient food handlers with emphasis upon the need for personal cleanliness.

4. Proper and thorough cleansing and steaming of all food containers after serving each meal.

5. Sigmoidoscopic, cultural, and serological examination of every employe and patient who handles or is assigned to handle food in any capacity whatsoever. Any individual patient or employe who develops a diarrhea while engaged in this work, or is found to be suspicious on examination, must be dismissed until a diagnosis is made.

6. An individual who has been isolated for

bacillary dysentery must not be permitted to engage in any culinary capacity during the entire period of his employment or confinement in an institution.

7. Every case of diarrhea must be immediately reported, the patient isolated, examined and sigmoidoscoped, culture and blood taken and a diagnosis made as soon as possible. All suspicious cases must be kept in isolation and treated until an exact diagnosis is determined.

8. Provision should be made for adequate quarters to facilitate effective isolation and, subsequently, a quarantine period of at least one month.

9. Isolation wards should be provided with hot and cold water, toilets, and facilities for thoroughly cleansing and steaming food containers before being returned to the general kitchen; for the proper disposal or burning of all garbage collected in the wards; and for the disinfection of all linens before being sent to the laundry.

10. Sigmoidoscopy should be included in the routine examination of every patient admitted to an institution; and, if feasible, cultures should be taken. Every suspicious case must be immediately isolated and observed.

11. In the management of bacillary dysentery sigmoidoscopic examinations at frequent intervals are imperative in order to determine the progress being made by a patient. Under no circumstances should a patient be discharged from isolation until sigmoidoscopic examinations, made a week apart, reveal a normal mucosa for a distance of 20 to 30 cm. and the cultures are negative. When a patient is positive, three consecutive negative cultures are necessary before discharge.

V

MANAGEMENT OF INSTITUTIONAL DIARRHEA

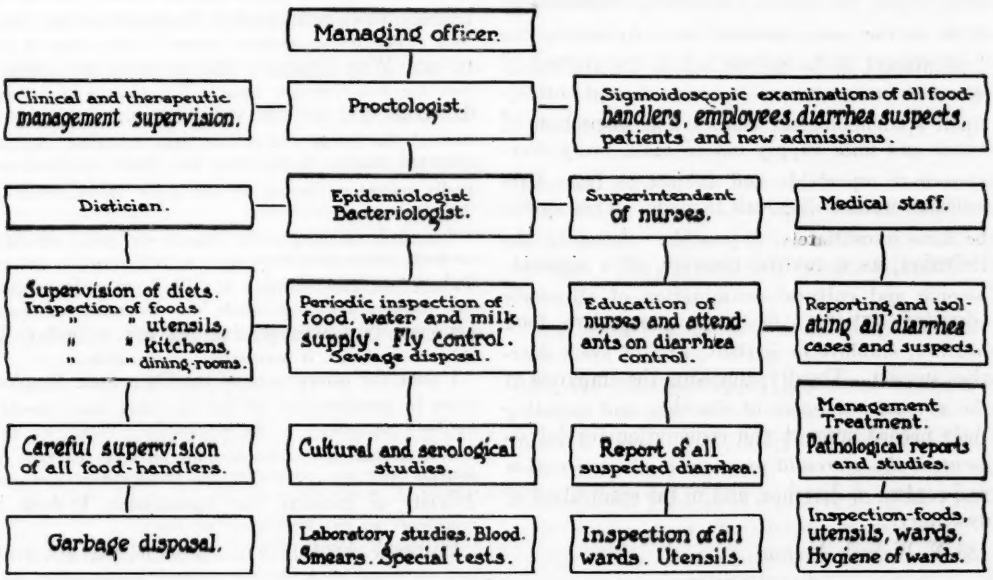
Managing officer.
Clinical and therapeutic management supervision.
Proctologist.
Sigmoidoscopic examinations of all food-handlers, employees, diarrhea suspects, patients and new admissions.
Dietician.
Epidemiologist Bacteriologist.
Superintendent of nurses.
Medical staff.
Supervision of diets. Inspection of foods " " utensils, " " kitchens, " " dining-rooms.
Periodic inspection of food, water and milk supply. Fly control. Sewage disposal.
Education of nurses and attendants on diarrhea control.
Reporting and isolating all diarrhea cases and suspects.
Careful supervision of all food-handlers.
Cultural and serological studies.
Report of all suspected diarrhea.
Management Treatment. Pathological reports and studies.
Garbage disposal.
Laboratory studies. Blood. Smears. Special tests.
Inspection of all wards. Utensils.
Inspection-foods, utensils, wards. Hygiene of wards.

CHART V.

Schematic outline of the plan employed for the management of diarrhea and of eradication of bacillary dysentery at the Elgin State Hospital.

SUMMARY AND CONCLUSIONS

1. A study has been presented of 1351 cases of diarrhea occurring in the Elgin State Hospital during the past three years.

2. The greatest number of cases occurred during the first year of this study as a result of an epidemic of bacillary dysentery. Subsequent to this period, there was a marked decrease in the prevalence of this disease culminating in a pro-

portionate reduction in the total number of diarrhea cases observed.

3. The etiology was quite varied and may be conveniently divided into the infectious, parasitic, obstructive and functional types.

4. The diagnosis was predominantly based upon the results of direct visualization, with a sigmoidoscope, of the lesions involving the distal bowel, in addition to cultural, serological and tissue studies and physical examination.

5. The management of diarrhea depends entirely upon the cause. However, insomuch as 81% of the cases observed were dysentery, the first precept to be carried out in the control of diarrhea in institutions is not to depend entirely upon epidemiological studies and inspection of water and milk supply but to make every diarrhea case reportable and subject to immediate isolation until a diagnosis is made. This should be done immediately, if possible. Secondly, the inclusion, as a routine measure, of a sigmoidoscopic and cultural examination of all newly admitted patients; of every prospective food handler, employe or patient; and of every diarrhea suspect. Thirdly, apprising the employes of the potential dangers of diarrhea and enlisting their needed support and cooperation for fulfillment of the aforesaid program in the prevention and control of diarrhea, and in the eradication of dysentery.

185 N. Wabash Avenue.

DISCUSSION

Lloyd Arnold (Chicago): Just a word from the bacteriologist about the bacillus of dysentery, particularly as to the difficulty we have in diagnosis. The group of bacteria causing dysentery are a very variable group. They alter in morphology, in biochemical relation, alter in antigenecity and alter their toxicity. With a single strain classified by sugar fermentation, if you follow through week after week in artificial culture, you will change its name at least half a dozen times during a year of sub-culture. They are a very unstable group of bacteria. They seem to be an undifferentiated group.

From a bacteriological standpoint, our ideal as a diagnostic media for gastrointestinal pathogenic bacteria is to develop a media that will inhibit the growth of non-pathogenic forms and allow the pathogenic forms to grow. We are successful when we apply it to the causative agents of typhoid fever and paratyphoid fever. A dozen or more very successful media will do just that. They will suppress the coli and allow the typhoid and paratyphoid bacteria to grow. We do not possess a single medium that will allow the dysentery group to grow except that it allows everything else to grow. Anything that is detrimental, added to the media to suppress what we call the saprophytic growth will, at the same time, suppress the dysentery growth. So the bacteriologist is handicapped in culturing the dysentery group of bacteria for that reason.

I think the work of Dr. Block is very interesting. It actually opens up an avenue of diagnosis, inasmuch as our bacteriological information has been so sketchy and so incomplete.

If we consider as we usually do in bacteriology, that the dysentery bacteria reside in the lower end of the small intestine and the upper end of the large intestine, this is the cause of mucosa lesions varying in intensity, which corresponds to the severity of the symptoms. The lesions seldom extend to the sigmoid and rectum. What happens is that the toxins are absorbed into the blood stream from the lesions in the ilium, the cecum, and the ascending colon, and are excreted through the lower end of the large intestine. So the abnormal mucosa lesions that Dr. Block described are really excretory lesions at the point of excretion of the toxins.

Inasmuch as the chronic dysenteries, using our best medium, never give more than a 10% positive culture (where we can transfer to the best media within five minutes after we obtain the specimen, we never get more than 10% positive), if such a method as this can assist us, it is certainly worth while.

I think the management of the Elgin State Hospital is to be complimented on the way they have handled bacillary dysentery in an institution. When we get a foci started, the reservoir built up with the type of patients and the possibility of transmission and the difficulty of breaking that transmission, I think it represents an excellent piece of work.

Charles F. Read (Elgin): I would like to correct one statement made by Dr. Arnold, to the effect that the management of the Elgin State Hospital is to be especially complimented on the reduction of this morbidity rate due to bacillus dysentery. The entire credit, I believe, is due to our consultant, Dr. Block, to his advisor, Dr. Arnold, and his assistant, Dr. Greene, of our staff, who have done really a monumental piece of work. No one looking at these slides can imagine the amount of energy expended in making all the necessary tests, examinations and arrangements for the care of these cases. It has been a very fine piece of work, as you can see from the slides.

The morbidity has reduced from something like 10% or more to about two tenths of 1%. This is a very important matter, inasmuch as the mortality rate has been considerable, especially in the higher age brackets. Certainly the general staff of the institution has cooperated in following out the plan as developed by the doctors concerned, to isolate the patients, to treat them properly and to pick up new infections as rapidly as possible.

Recently I have read an article by Dr. K. C. Paddle in the January British Journal of Mental Science dealing with this problem, which is a very considerable one in England, and perhaps recognized as such there

more than it is here. I was surprised at the large number of positive cultures obtained by immediate inoculation of plates at the bedside or in a closely adjoining laboratory. There they have developed a serum which they feel is very effective. I wonder why it is that with our media and immediate making of cultures, we have not been more successful, in view of the statements of these British physicians.

Dr. Louis H. Block, Chicago (closing): I wish to thank Dr. Arnold and Dr. Read for their splendid discussion of our paper. I also wish to thank Dr. Read, Dr. Arnold, the members of the staff of the Elgin State Hospital and of the State Department of Public Health and the Laboratories of the University of Illinois for their unusually splendid cooperation.

In answer to Dr. Read's question as to why others report a greater percentage of positive cultures in their series of cases, I can only say that I am inclined to be somewhat skeptical about it. However, Dr. Arnold is better able to answer that question. I am sure it is not that our technique is at fault, but as far as the effect of immunization with vaccine or the treatment with serum is concerned our results have not been as glamorous as that reported by others. We have employed various types of serums, including convalescent serum and have used desiccated vaccine, the results of which we shall report in another paper, but we have not been as successful as some of the investigators in other institutions.

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THE TREATMENT OF INTRACRANIAL GLIOMAS

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Gliomas are "cancers" in the sense that they are infiltrating neoplasms without any tumor capsule which tend to recur unless widely removed. True, they never (or at least very rarely) metastasize as do cancers elsewhere. Certain types may, however, spread throughout the cerebrospinal axis by tumor implants in the cerebrospinal fluid spaces. Unfortunately there is much confusion among the profession in general as to the prognosis and results of treatment of these tumors.

In most general discussions of neoplastic growths tumors of the brain are disregarded. Yet the problems of neoplastic growth are the same in the brain as elsewhere, though modified by certain important factors. The increased interest in intracranial tumors during the past few decades has made it apparent that they are more common than previously supposed. Whatever one may think of the individual value of the various statistical studies that have been published on this subject, taken in the aggregate, they point inescapably to that conclusion.

Intracranial tumors as a whole are too heterogeneous a group to be considered in common. The earlier attempts at classification separated the intrinsic tumors of the brain from the extrinsic. The former were known inclusively as gliomas, and until very recently, the only attempts at their further classification were abortive. As a matter of fact all encephalic tumors are not gliomas, as an occasional sarcoma or hemangiomatous tumor may arise from the connective tissues of the brain. However, these are relatively rare, and for our purposes we may consider the gliomas as representing those tumors which arise from the encephalon proper. As a result of the careful studies of Bailey and Cushing, and later of Penfield and many others, the origin and relatinship of the various types of gliomas is being gradually unraveled. The various classifications of gliomas in use at present are practically all based on the pioneer work of Bailey and Cushing and include, depending on their complexity, from seven to seventeen different types. The subject of the structural differences in these various types is a detailed and complicated one.

I want to emphasize that there are marked and important differences in the clinical behavior of the major groups of gliomas. Consequently the proper pathologic classification of a glioma aids in giving a prognosis and in determining suitable treatment. Conversely, careful clinical study of the patient will often lead to a correct preoperative diagnosis. This last is our ideal and is to be sought for here as in tumors elsewhere.

From Mercy Hospital-Loyola University Clinics and the Cook County Hospital.

Presented before Sections on Surgery and Radiology, 98th Annual Meeting, Illinois State Medical Society, Springfield, May 18, 1938.

The relative frequency of gliomas among intracranial tumors is a matter of interest. Cushing's series of over 2000 histologically verified intracranial tumors contained 42.6% gliomas. Adson had 43% of gliomas in 162 consecutive histologically verified cases of intracranial tumors. In a series of 314 histologically verified cases of frontal lobe tumor reported by Voris, Adson and Kernohan, 62% were gliomas. Obviously the last group was a selected one that contained a higher percentage of "encephalic" tumors. In the same series of frontal lobe tumors, 75% of the gliomas occurred during the fourth, fifth and sixth decades; there were nearly twices as many men as women with gliomas.

As previously stated, and as would be expected, there is considerable correlation between the microscopic evidences of malignancy and the clinical history of the patient. Bailey states the average "survival times" in months for the various types of gliomas wherever found. They range from a minimum of twelve and fifteen months for glioblastomas and medulloblastomas respectively to a maximum of sixty-six and seventy-six months for oligodendrogliomas and astrocytomas.

It is my opinion that while such broad attempts at correlation of microscopic evidences of malignancy and clinical course are of great value, the situation is so complicated that further attempts at analysis are justified. The duration of life compatible with intracranial tumor depends on at least three factors. The first is the rapidity of growth of the tumor, and this is probably in most cases in direct relation to the microscopic evidences of malignancy. This factor is important not only because of the simple time element concerned in growth, but also because the intracranial contents adjust themselves better to slow increase in pressure; hence slow growing tumors may exist for long periods of time or reach relatively great size before giving rise to acute symptoms. The second factor is the situation of the tumor, and this may be of the greatest importance; for example, a fibrous astrocytoma in the midbrain may, while still very small in size, produce death by blocking the aqueduct of Sylvius and producing internal hydrocephalus. Again tumors of the brain stem must soon result fatally because of the importance to life of the bulbar or diencephalic centers that become involved so early in these cases. On the other hand, tumors may reach great size before producing serious symptoms, especially if situated above the tentorium. If located in so-called "silent areas" the first warning of their presence may be the onset of signs of increased intracranial pressure, developing rather suddenly when the tumor has reached such a size that mechanical adjustments can no longer be made by the intracranial contents. Finally, the third factor is the treatment, which is given, viz., the type and the extent of surgical procedure and the amount of radiation that may be employed.

In the study of frontal lobe tumors previously referred to, the variable factor of treatment was eliminated by confining the study to the period from the appearance of the initial symptom or symptoms referable to an intracranial lesion to the time that the patient first came to the attention of the surgeon. Further, because these tumors were confined to the frontal lobe, the situation of the neoplasm was perhaps less important than it would be for tumors in any other part of the brain. Only rarely do tumors of the frontal lobe produce obstructive hydrocephalus (tumors in or near the midline may do so by occlusion of the foramen of Monroe, but this is rare) and moreover this portion of the brain contains a large area of "silent" cortex. Almost half (45%) of the patients with glioblastoma, and exactly 50% of all the gliomas had symptoms referable to an intracranial lesion for more than a year. Over 15% of all gliomas and 10% of the glioblastomas had symptoms for more than five years before coming to the attention of the surgeon.

The diagnosis of intracranial tumors has become increasingly important with the development of improved surgical procedures which offer improvement if not cure to these patients. In making a diagnosis of an organic intracranial lesion it is necessary to proceed in an orderly fashion, taking a thorough history, doing a complete general examination to distinguish coexisting disease, and then proceeding with a neurologic examination. Ophthalmoscopic examination will reveal the condition of the ocular fundi and determination of the visual fields will often reveal localizing defects. Roentgenographic examination of the skull may demonstrate localized erosions, increased convolutional markings, hyperostoses, deposits of calcium within neoplasms, or shifting of a calcified pineal gland. Spinal fluid

examinations are sometimes necessary to differentiate inflammatory or degenerative lesions, but usually give little information of positive value in intracranial tumor. If choked discs are present spinal puncture is usually contraindicated.

It must be emphasized that the diagnosis of intracranial tumor should be made, if possible, before signs of increased intracranial pressure appear. This does not occur until a tumor reaches such a size that the intracranial contents can no longer adjust themselves to the increase in pressure, or until it blocks the circulation of cerebrospinal fluid (as when in the cerebral aqueduct or the fourth ventricle) and produces an internal hydrocephalus. Too often this represents an advanced stage and the high intracranial pressure plus the size and extent of the tumor add greatly to the dangers of surgical intervention. Hence it behooves us to make an early diagnosis whenever possible. In order to do this it is necessary to keep the possibility of intracranial tumor in mind whenever confronted with symptoms of a cerebral lesion. We must remember what Bailey has well said, viz., that "there is only one cardinal sign of tumor of the nervous system—a nonfebrile, steadily increasing alteration of nervous function," and whenever this is seen, confirm or exclude the presence of a tumor.

At times it is necessary to resort to surgical measures in order to definitely diagnose or localize an intracranial tumor. Dandy has given the neurologic surgeon an invaluable aid in ventriculography. This procedure is not without danger, but when judiciously performed will usually solve the difficulties of localization which may be present. If exploration does not immediately follow the ventriculography, it will often be necessary after the roentgenograms are made to remove the air that was injected in order to prevent untoward symptoms. Often simple ventricular puncture or estimation is sufficient to localize the lesion. By tapping both ventricles, if one is found to be small, containing only a few cubic centimeters of fluid, not only is an infratentorial tumor eliminated, but the lesion is lateralized to the side of the small ventricle. If both ventricles are dilated, patency of the foramen of Monroe may be tested by injecting a dye, as methylene blue or indigocarmine, into one ventricle and attempting to recover it from the other. A communicating hydrocephalus speaks for an infratentorial lesion. In such cases injection of air should be proceeded with and the usual films made, as a filling defect of a lateral ventricle may reveal an unsuspected frontal or temporal lobe tumor.

The surgical exploration of the cerebral hemispheres is usually carried out through some type of osteoplastic flap arranged so as to preserve the blood supply and give the desired exposure without producing disfiguring scars. Usually the scalp, temporal muscle and bone are reflected together, although at times it is desirable to reflect the scalp flap separately, or to reflect the scalp and temporal muscle as a combined flap and carry out a decompression opening beneath. Tumors of the temporal lobe can sometimes be removed satisfactorily through such an opening. All suboccipital craniotomies are in reality suboccipital decompressions, since the bone rarely is elevated as a flap, but is removed with a rongeur and is not replaced during the closure. To make the sub-occipital decompression most effective, the occipital bone should be removed widely and the decompression should include the dorsal portion of the foramen magnum and the arch of the atlas.

The surgical procedures that may be carried out on gliomas depend on their location and degree of malignancy. Those situated in "silent areas," as the frontal, temporal or post-parietal regions of the cerebral hemisphere or the vermis or hemisphere of the cerebellum can be resected with adjacent brain tissue; that is, partial or complete lobectomy can be carried out. While some neurologic or psychic change always follows the loss of brain substance, yet such changes are minimal for the right frontal and temporal lobes or for cerebellar tissue and consequently tumors of these regions can be attacked more radically. Gliomas situated in the motor cortex or in the speech area of Broca must be treated more conservatively, with only subtotal resection from the central part of the tumor to avoid increasing motor disturbances already present or obviating the possibility of return of function in already totally hemiplegic patients. Removel of entire cerebral hemispheres has been performed in some cases by certain surgeons. Such extensive procedures are necessarily limited to a small group of patients. Tumors that require such extensive resection will usually have invaded the basal ganglia and thalamus, and unless these also are resected, removal

will be incomplete. I question whether we are justified in extending the life of a patient at the cost of partial or complete spastic hemiplegia for his remaining years.

The type of glioma exposed at operation has great bearing on the procedure to be followed. As soon as the tumor is exposed an immediate biopsy should be performed. At this point the aid of a pathologist experienced in the histopathology of gliomas is invaluable to the surgeon. Of course the latter should, as far as possible, learn to depend on the gross appearance of the neoplasm, but the diagnosis is difficult enough with all possible aids. The more benign types, as the astrocytomas and oligodendrogliomas, should be as widely removed as their situation permits. Astrocytomas are often cystic, and if the mural tumor on the wall of the cyst can be removed permanent cure will be effected. The rapidly growing and rapidly recurring oligodendroblastomas and medulloblastomas had best be treated with generous decompression to be followed by massive doses of roentgen therapy. Glioblastoma is the most frequent glioma in most of the reported series. Generally speaking, these tumors rapidly grow, rapidly recur, and respond poorly to roentgen therapy. However, they are a heterogeneous group both pathologically and clinically. When favorably situated, and of relatively small extent, radical resection should be carried out. In all cases the patient should have the benefit of large doses of roentgen therapy.

Decompressions at the base of the osteoplastic flap beneath the temporal muscle are worth while and offer additional relief in the case of partially removed and inoperable tumors. They also provide safety valves against the temporary edema that may follow the later administration of x-ray. At times patients whose condition does not permit an extensive surgical procedure may recover sufficiently after subtemporal decompression for a later attack upon the tumor.

Roentgen therapy has proved of the greatest value in the treatment of some gliomas, of considerable assistance in others, and has been very disappointing in still others. Davis and Weil, Deery, Frazier, et al., and others have carried out careful studies, with histologic controls before and after treatment, on the effect on roentgen rays on the gliomas. It is generally accepted that the most malignant, the medulloblastoma, is quite susceptible to x-rays and responds well temporarily. Unfortunately, recurrence is the rule. The more benign tumors, astrocytomas, oligodendrogliomas, etc., respond poorly and seldom show much change as the result of therapy. Ependymomas, according to Frazier, show some response. Glioblastomas in the main are not radiosensitive, although occasionally surprisingly good clinical results are obtained with roentgen therapy.

In view of this varied response it is my opinion that the x-ray treatment of gliomas should never be undertaken without previous surgical exploration with determination of the type and extent of the tumor in so far as possible. Then, depending on the findings, radical resection of the tumor may be carried out, with perhaps the administration of x-ray later as a prophylactic against recurrence. Or partial removel of the neoplasm may be done, and then this supplemented with decompression and energetic roentgen therapy. Finally, the indicated treatment may be simply a decompression to provide temporary relief, with massive doses of high voltage x-rays as the principal therapeutic agent.

The following case reports are illustrative of some of the above points:

Case 1: Oligodendroblastoma of left frontal lobe; admitted 11-21-34; operation, 11-22-34; dismissed 12-22-34.

N. E., a white male aged 37, had during the six months before admission to Mercy Hospital noticeable mental changes, consisting of loss of memory for recent events, depression and irritability. Headaches and failing vision had been present for three months, and during this period he had three or four attacks of momentary weakness and numbness of the right lower extremity.

Examination revealed a well-nourished white male whose responses were slow and who seemed dull and indifferent. He seemed to lack appreciation of his situation, was somewhat facetious and exhibited definite "Witzelsucht." There was a bilateral papilloedema of three diopters with hemorrhages and exudates. The preoperative diagnosis was left frontal lobe tumor.

A left frontoparietal osteoplastic craniotomy revealed a very vascular infiltrating tumor coming to the surface in the superior frontal convolution. A biopsy was made, and the pathologist reported the tissue to be from a "malignant glioma." A large subtemporal decompression was made and the wound closed. Later examination of the tumor tissue with special stains revealed it to be an oligodendroblastoma.

Convalescence was uneventful until the fifth postoperative day, when a complete right hemiplegia and a marked aphasia appeared. This was thought to be due to postoperative vascular changes in the left cerebrum. High voltage roentgen ray treatment was begun on 12-3-34. He received a total of 3,360 r units during the next 15 days, divided into 14 fractions. There was gradual neurologic improvement and at dismissal there was only moderate residual hemiparesis and aphasia. The papilloedema was subsiding.

By 2-9-35 the hemiplegia and aphasia had disappeared and the optic fundi appeared normal. The decompression bulged moderately. The patient returned to work as an automobile salesman in April, 1936, and worked until September, 1936, when there was a reappearance of right hemiparesis and partial aphasia. He was again given roentgen ray treatment, a total of 5,040 r units, divided into 20 fractions in October, 1936, and another series of 4,500 r units in 18 fractions in December, 1936.

From that time to the present he has remained well. When last seen (3-25-38), neurologic examination was negative except for slight hesitancy of speech and slight euphoria. The decompression was flatter than at any time since operation and very soft.

Case 2: Medulloblastoma of cerebellar vermis; admitted 1-4-38; operation, 1-5-38; dismissed 1-19-38.

J. D., a white boy aged eight, had three months before admission to Mercy Hospital a brief episode of headache and stiff neck and was suspected of having poliomyelitis. He quickly recovered from this and was well until three weeks before admission when diplopia suddenly appeared. At the same time he became ataxic and clumsy and began to have frontal headache. He had vomited on three occasions.

Examination revealed moderate ataxia with tendency to deviate to the right. The head was tilted to the right. The Romberg sign was positive bilaterally, and there was a positive Babinski response on the left. There was a "cracked pot" percussion note of the head and the optic fundi showed bilateral papilloedema of two to three diopters with hemorrhages and exudates. X-rays of the skull showed increase of the convolutional markings with slight separation of the sutures. The preoperative diagnosis was mid-line cerebellar tumor, probably medulloblastoma.

Operation consisted first of a preliminary ventricular estimation that revealed an internal communicating hydrocephalus. This was followed by a midline cerebellar exploration and decompression. A purplish gray, friable, vascular tumor presented itself at the lower end of the fourth ventricle. A biopsy of this was reported as medulloblastoma by the pathologist. The wound was then closed.

Convalescence was complicated by a convulsion the night after operation and by extreme restlessness for 48 hours. The wound healed by primary intention, and high voltage x-ray treatment was begun 12 days after operation.

He received x-ray treatment to the entire cerebrospinal axis as follows: 2500 r units to the cerebellum in ten fractions; 1500 r units to the cerebrum in six fractions; 850 r units to the cervical and thoracic spine in three fractions; 900 r units to lower thoracic and lumbar spine in three fractions; and 900 r units to the sacral region in three fractions; a total of 6650 r units in 25 fractions.

The child has steadily improved, and when last seen (4-27-38) the decompression was flat, the fundi were normal (vision 20/20 O.U.), and there were no objective neurologic findings. He was gaining weight and was in excellent physical condition.

Case 3: Glioblastoma of the right frontal lobe: admitted 1-16-36; operation 1-27-36; dismissed 2-20-36.

C. N., a white female aged 55, had severe frontal headache for five weeks before admission to the Cook County Hospital. For one week nausea and vomiting had been present, and she had been dull, drowsy and indifferent.

Examination revealed bilateral frontal percussion tenderness. There was moderate weakness of the left extremities and slight weakness of the lower part of the left side of the face. The left abdominal reflexes were absent; there was a Hoffman sign on the left, and reflex grasping could be elicited in the left hand. There was bilateral papilloedema of four diopters with numerous hemorrhages and exudates. The patient was disoriented for time, but not for place. She was dull and indifferent, with slow responses, and without insight into her situation. The preoperative diagnosis was right frontal lobe tumor.

A right frontal osteoplastic exploration revealed an extensive infiltrating subcortical tumor in the right frontal lobe. Material for biopsy was removed by aspiration through a cannula. The patient's condition did not permit any further surgical procedure. In order to close the wound it was necessary to remove the entire bone flap because of the extensive herniation of the brain. Later microscopic examination of the tissue removed showed it to be from a glioblastoma.

The patient rallied after operation and convalescence was uneventful. The left hemiparesis improved slowly, and at dismissal there was only slight weakness of the left side. High voltage roentgen treatment was begun before dismissal, and a total of 3920 r units was given, divided into 14 fractions.

The patient did well for five months, then there was a rapid recurrence of headache, vomiting and progressive paralysis of the left side. She was readmitted to the hospital and more roentgen treatment, a total of 1120 r units in four fractions, was given. She continued to fail and died 9-9-36. Permission for necropsy could not be obtained.

Case 4: Fibrillary astrocytoma of cerebellum: admitted 4-22-37; operation 5-10-37 and 5-24-37; dismissed 7-3-37.

L. H., a white female aged 15, had headache, vomiting and ataxia for six weeks before admission to the Cook County Hospital. Tinnitus was present in both

ears from the onset, and she lost eleven pounds weight during this period.

Examination revealed marked ataxia with a tendency to fall to the right or forward. The Romberg sign was positive. There was generalized muscular weakness with moderate hypotonia and incoordiation of all extremities. The Babinski sign was positive on the left and equivocal on the right. The optic fundi showed bilateral papilloedema of three diopters with some exudates, and there was bilateral weakness of the lateral recti. The patient was cooperative but drowsy and indifferent. The preoperative diagnosis was a mid-line cerebellar tumor.

Suboccipital exploration and decompression revealed a vascular infiltrating tumor of the cerebellar vermis. From the gross appearance it was thought to be a medulloblastoma and a biopsy was taken and the wound closed. Convalescence from this operation was uneventful. Microscopic examination of the tissue removed proved it to be from a fibrillary astrocytoma and accordingly further surgery was undertaken. Two weeks later the wound was reopened, and an extensive piece-meal resection of the tumor was performed, using the loop of the electrosurgical unit. The tumor occupied all but the most superior part of the vermis and extended laterally into the cerebellar hemispheres and into the dorsolateral wall of the fourth ventricle at the superior anterior part of the tumor. All of the tumor was removed grossly except the most superior and anterior part which was untouched because of its lateral extension into the medulla. At the close of the procedure the fourth ventricle was widely exposed, and the inferior end of the Sylvian aqueduct could be easily seen.

Convalescence was protracted and stormy. An irregular fever of 101° to 104° F. was present for two weeks. She was very listless and apathetic for three or four weeks. A cerebrospinal fluid fistula was present from the second to fourth weeks postoperatively. At dismissal the optic fundi showed no edema, but were pale with some loss of substance. There was slight weakness of the external recti and of the left facial muscles. She was moderately ataxic, alert and cooperative, but euphoric and facetious. A series of high voltage roentgen ray treatments was given after dismissal, a total of 5382 r units in 24 fractions.

When examined in October, 1937, vision was 20/30 O.U. There was slight generalized weakness and incoordination of the extremities, and the Romberg sign was positive. The general condition was excellent. When last seen (5-13-38), the Romberg sign was only slightly positive; the patient had returned to school and resumed normal activity, including dancing.

Case 5: Fibrillary astrocytoma right temporal lobe: admitted 9-12-35; operation 9-13-35; dismissed 11-7-35.

J. B., a white male, aged 33, had generalized convulsions for four and one-half years before admission to Mercy Hospital. He was also subject to frequent minor attacks of loss of consciousness. The major attacks were controlled fairly well with large doses of phenobarbital. Diurnal headaches had been present for one year. Encephalograms two months previously were considered as negative for tumor.

Examination revealed slight hyperactivity of the left tendon reflexes with positive left Hoffman and Rossolimo signs. The visual fields showed a partial left upper quadrant homonymous defect. The patient was somewhat dull and indifferent and seemed to lack appreciation of his situation. Roentgenograms of the skull revealed a slight shift to the left of a calcified pineal gland. The preoperative diagnosis was right temporal lobe tumor.

Right parietotemporal osteoplastic exploration revealed a firm fibrous subcortical infiltrating tumor 2 cm. beneath the surface of the superior temporal convolution. This was removed piece-meal with the electrosurgical loop. All the tumor was grossly removed, leaving a cavity approximately 3x3x5 cm. in the posterior part of the temporal lobe. The ventricle was not opened. Microscopic examination of the tissue removed showed it to be a fibrillary astrocytoma.

Convalescence was uneventful. High voltage roentgen therapy was given; a total of 5000 r units divided into 20 fractions. At dismissal the patient was in excellent health, and his only neurologic defect was an incomplete left upper quadrant homonymous visual field defect.

He has remained well to date (5-6-38). There have been no generalized seizures since operation. An occasional petit mal attack is his only complaint. Encephalography in October, 1937, showed slight enlargement and lateral displacement of the temporal horn of the right lateral ventricle. This was considered to be due to traction from the operative scar in the right temporal lobe.

Case 6: Astrocytoma of pons: admitted 7-28-37; encephalogram 8-6-37; died 8-18-37.

C. A., a white male aged 31, five months before admission to Mercy Hospital awoke with diplopia which was found to be due to a right internal strabismus. Two weeks later numbness of the left hand appeared. Progressive weakness of the left side of the body followed, and at admission the patient could hardly move the left upper extremity. Vomiting had occurred on a few occasions.

Examination revealed weakness and incoordination of the left extremities and the lower part of the left side of the face. The weakness was much more marked in the left upper extremity. The tendon reflexes were increased on the left, and the Hoffman and Babinski signs were positive on that side. The abdominal reflexes were absent bilaterally; the cremasteric reflex was present on the right but absent on the left. The right lateral rectus muscle was paralyzed. The optic fundi were normal, as were the visual fields. Roentgenograms of the skull and examination of the spinal fluid yielded no abnormal findings. One consultant made a diagnosis of neoplasm, another of encephalitis.

Encephalography was performed 8-6-37. The drainage was slow and tedious but without untoward incident. 105 cc. of fluid was removed and air substituted, using the fractional method. Roentgenograms made after this procedure showed slight enlargement of the ventricles with no distortion or displacement. The subarachnoid channels were well filled and appeared normal. There was less than the usual discomfort following the encephalogram.

There was slight improvement in both the diplopia and the left hemiparesis. Suddenly after eating lunch on 8-18-37 the patient had a generalized convulsion and stopped breathing. He received artificial respiration for eight hours but finally died.

Necropsy revealed a fibrous infiltrating tumor of the right side of the pons with a massive hemorrhage in the upper half of the pons on the right. This tumor proved on microscopic examination to be an astrocytoma.

SUMMARY

The condition of all patients with glioma of the brain is not hopeless. On the contrary, the results of surgical treatment of these tumors compare favorably with those obtained in "cancer" generally, and are much superior to the results in malignant tumors of other parenchymatous organs, as the liver, lungs, or kidney. Certain types in favorable locations can be completely removed, and long periods of relief of symptoms can be obtained in other cases by subtotal removal of the tumor. Again high voltage roentgen therapy is of great value in some of these neoplasms. Finally, the relief of symptoms afforded by decompression alone is often comparable to that given by such procedures as gastroenterostomy or colostomy in carcinoma of the stomach or colon.

The results are constantly improving and the mortality rate decreasing but, as in all malignant tumors, there is a crying need for earlier recognition and localization of the disease. The surgeon himself must be qualified to evaluate clinical findings and to carry out the meticulous surgical procedures required. Close cooperation between the surgeon and the radiologist is a necessity if the patient is to be given the benefit of the best available treatment.

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DISCUSSION

Dr. P. A. Nelson, Chicago: I want to congratulate Dr. Voris on his excellent paper. I wish to stress the necessity of referring cases of brain tumors to the neurosurgeon at the onset of the disease rather than after symptoms have persisted for months. I also believe that decompression should be done in order to obtain tissue for microscopic study. Decompression makes it very much less dangerous to irradiate these tumors if that is the treatment decided upon. Also it is important because tumors may be diagnosed incorrectly from the clinical findings alone. Many brain tumors require surgery alone, but others respond best to a combination of surgery and irradiation.

The first case presented by Dr. Voris was a man with a brain tumor who was operated upon. His irradiation was begun while he was still bed-ridden and unable to walk. In the first series he was given 3360 r units and 14 treatments. That was followed in October, 1936, by 20 fragmented treatments of 5040 r units. The treatment was repeated in December, 1936, in which 18 divided treatments were given of 4500 r units. This made a total of 12,900 r units with no appreciable damage to the skin or areas treated. I think irradiation can be carried to far greater limits than we have heretofore. We have been careful and tried to remain on the conservative side.

The second case Dr. Voris presented was a cerebellar medulloblastoma, and I think the important thing to emphasize is that after the diagnosis is made medulloblastomata are radiological problems. However, decompression is almost a necessity because it makes radiological treatment so much easier. The other fact that is important is that the entire spinal fluid conducting system must be treated. The patient was given 1500 r units and 2650 r units—a total of 6650 r units. This course was repeated in six weeks over the cerebellum, the cerebrum and the vertebral column. At the end of three months 1500 to 3000 r units were given over the tumor area or cerebellum.

The fifth case he presented was one in which not much could be expected from radiation. He suggested radiation because he believed that the tumor was not thoroughly removed, and for that reason radiation was instituted. The growth is at least under control for the time being.

POSTNATAL COMPLAINTS IN 1000 CONSECUTIVE CASES

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Postnatal complaints are many and varied. In general they may be divided into two groups, namely, 1. those due to parturition itself; 2. those not related to labor. These complaints were observed in 1000 consecutive cases excluding cesarean section. The symptoms were noted as the patient perceived them and recorded together with the physical findings. It was then seen that the symptoms and the objective findings could be arranged into subgroups. The results of this study are as follows:

There were 610 multiparae and 390 primiparae. Eight hundred and six or 80.6% had one or more complaints. The complaints due to labor may be divided into 1. those of the pelvic organs as after-pains, disturbances of the bladder, rectum, abnormal bleeding, pain over the symphysis and pain in the coccyx; 2. those of the breasts as pain, painful nipples, axillary swelling, galactorrhea; and 3. those from sutures.

After-pains were by far the most frequent and occurred in 447 multiparae or 773.3% of 610 cases and in 29 primiparae or 7.43% of 390 cases. The locations were in the lower abdomen, the small of the back, the inguinal regions and rarely the legs in that order of frequency. They varied in intensity and character from a few mild aches to severe cramps requiring analgesics. They were often more severe during nursing or would be present only at this time. Occasionally they were absent for the first 24 hours even though the infant did nurse. The number of labors in multiparae did not influence the duration of the pains, the longest being six days; in a para four. Some patients stated that they had had after-pains after some labors and not after others. Of the multiparae 98 had after-pains one day, 156 two days, 132 three days, 49 four days, 11 five days and one six days. Of the primiparae 15 had after-pains one day and 14 had after-pains two days. In 15 primiparae the lochia were profuse during the duration of the after-pains and in 14 they were moderate or normal. Only one of the primiparae having after-pains gave a history of previous abortion, ten gave a history of cramps during the menstrual period and four had gram negative intracellular diplococci.

Complications in the genito-urinary organs were: 1. Retention of urine. 2. Involuntary urination. 3. Frequent urination. 4. Pain after urination.

Retention of urine. Difficulty in urinating occurred in 39 patients, 31 primiparae and eight multiparae. Its cause is problematical. The difficulty was psychic in seven of the patients as they did not have the difficulty until the third or fourth day when another patient was put into the room (all rooms at the Lewis Memorial Maternity Hospital contain either two or three beds). In the other 32 the retention was probably due to trauma. The day of onset, number and duration in days were as follows:

Day of onset	1	2	3	4	5	6	7	8
Number 32	0	3	4					
Duration in days	1	2	3	4	5	6	7	8
and Number 14	11	3	5	2	3	0	1	

Involuntary urination occurred in four cases, two primiparae and two multiparae. In three patients it occurred on the first day and in one on the fifth day. The duration was one day in one patient, two days in another and five and six days in one case each. In the first two cases ischuria paradoxa was present, in the third case which lasted five days there probably was an injury to the sphincter as the condition followed a difficult forceps delivery. And in the fourth case, the condition lasted six days; upon interrogation it was found that she had involuntary urination for three months previous to delivery and also that she had a similar condition with a previous pregnancy.

Frequent urination was observed in three patients, two primiparae and one multipara. It occurred on the first, third and fourth days respectively. It lasted one day in two cases and four days in one case, the diagnosis in the latter being pyelitis. In the other two the diagnosis was urethritis and cystitis.

Pain after urination occurred in three cases, all primiparae. In two it was present on the first day and in one on the eighth day. In all three the cause was irritation of the episiotomy wound by urine. In the case occurring on the eighth day the pain was experienced upon removal of the sutures. The duration was one day in two cases and two days in the third.

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Bleeding. Hemorrhages to which the patients called our attention numbered four, two of which occurred in primiparae and two in multiparae. They occurred on the first, second, ninth and tenth days respectively. In one case the bleeding occurred on two successive days and in the other three on only one day. The diagnosis was atony of the uterus in all cases.

Pain over the symphyseal region occurred in four patients, two primiparae and two multiparae. In two patients the pain occurred on the second and third day each and in the other two on the fifth day. In the latter two it was due to distention of the bladder and relieved by catheterization. In the other two it was due to trauma to the symphysis in one case and lasted three days, while in the other case the pain seemed to be in the muscles attached to the symphysis and lasted two days.

Pain in the coccyx. Three primiparae had this complaint which was due to trauma during passage of the fetus. The pain was noticed on the second day in two cases and on the third day in one case. It lasted two days in the former and one day in the latter.

Pain in the rectum was present in 25 patients, 17 primiparae and eight multiparae. The diagnosis and numbers were: hemorrhoids 22; sutures two and hematoma in the episiotomy incision one. The days of onset, numbers and duration were:

Day of onset	1	2	3	4	5	6	7	8	9
Number	18	3	0	0	0	1	1	1	1
Duration in days	1	2	3	4	5	6	7	8	9
and									
Number	3	4	5	7	1	2	1	1	1

Pain in the breast occurred in 196 patients, namely, 76 primiparae or 22.31% in 390 cases and 109 multiparae or 17.87% in 610 cases. In 174 cases the diagnosis was engorgement, in 22 mastitis and in two breast abscess. The day of onset in either primiparae or multiparae and duration in days was as follows:

Day of onset	1	2	3	4	5	6	7	8	9
Primiparae	0	3	12	40	19	9	2	2	0
Multiparae	1	9	21	44	22	7	4	0	1
Duration in days	1	2	3	4	5	6			
and									
Number	105	45	22	14	9	1			

Therefore the onset of painful engorgement in either primiparae or multiparae occurred on the fourth day in the greatest number of cases, namely, in 45.97% of the former and in 0.37% of the latter and in the majority, namely, 105 or 53.57% it lasted one day.

Painful nipples. Eighty-seven patients, namely, 32 primiparae and 55 multiparae, complained of sore nipples. Blisters were found in 45 patients, erosions in 17, vertical cracks in 11, circular cracks in five and no demonstrable disease processes in nine cases. The day of onset and duration were as follows:

Day of onset	1	2	3	4	5	6	7	8	9	10
Number	4	10	18	20	15	9	7	3	1	0
Duration in days	1	2	3	4	5	6	7	8	9	10
and										
Number	19	29	12	9	8	5	2	1	1	1

Swelling in the Axilla. Although swollen axillary glands are common only seven patients had this complaint, namely, three primiparae and four multiparae. The day of onset was: four on the fourth day, two on the fifth and one on the sixth day. The discomfort lasted one day in three patients, two days in three patients and three days in one patient.

Galactorrhea. Although some milk is often lost between feedings, only one patient brought this to the doctor's attention. It occurred in a primipara on the fourth day and lasted one day.

Discomfort due to sutures was observed in 101 patients. The frequency may be assigned to the great number of episiotomies performed, namely, 327. Three patients had infected sutures; seven patients had edema. In the remainder of the cases the discomfort was caused by the irritation of the silk-worm gut. The day of onset and duration were as follows:

Day of onset	1	2	3	4	5	6	7	8
Number	77	8	2	2	5	6	1	0
Duration in days	1	2	3	4	5	6	7	8
and								
Number	18	13	20	15	11	5	6	13

The foregoing complaints were directly related to parturition. The complaints remotely or not at all connected with parturition will be considered according to their location and frequency.

1. HEAD AND NECK

Headache. Sixty-six patients, namely, thirty primiparae and thirty-six multiparae, complained of headache. The etiology was: constipation 17, mastitis 12, lochia retention six, salpingitis three, upper respiriatory infection three, hypertension and toxemia three, mastoiditis, sinusitis, cystitis, endometritis and eyestrain one each. In 17 patients no diagnosis was made. The day of onset and duration in days were as follows:

Day of onset	1	2	3	4	5	6	7	8	9	10
Number	5	6	15	14	8	5	5	4	3	1
Duration in days	1	2	3	4	5	6				
and										
Number	46	12	4	1	2	1	0	0	0	0

Coryza. Four primiparae and two multiparae complained of "colds." Three had the symptoms

on the first day, two on the second and one on the eighth. It lasted two days in four patients and four and five days in each of the other two.

Sore throat occurred in six patients, one each on the 2, 3, 6, 7, 9 and 10th days. In five the duration was one day and in the sixth it was present for five days. The latter had a septic sore throat.

Disturbance of vision. In spite of a large number of cases of hypertension with toxemia only one patient complained of spots before the eyes on the second day postpartum from this cause. Another patient had this symptom on the tenth day when getting up and out of bed. There was one case of amaurosis which persisted for eight days following delivery.

Toothache occurred in two patients, both multiparae. It was present on the third and sixth days in one case each and lasted one day in both cases.

Earache. Earache occurred in two cases, both multiparae. It was present on the third and fourth days in one case each and lasted one and four days in one case each.

2. CHEST ORGANS

Cough. Eight patients, namely, two primiparae and six multiparae, complained of cough. There were three on the first day, one on the second and third days, two on the fifth and one on the eighth days. Six patients had a cough one day, one had it for three days and one left the hospital with a cough. The latter had a pulmonary tuberculosis. Of the others, five had an upper respiratory infection and two a bronchitis.

Pain over the heart was present in five cases, three primiparae and two multiparae. The day of onset was: one on the first day, two on the second day and one each on the fifth and sixth days. It lasted one day in three patients and two days in two patients. Two of the patients had cardiac disease while in two others the pain was due to tympanites. In the fifth case no diagnosis was made.

Pain in the chest occurred in four patients, two primiparae and two multiparae, one each on the first, second, third and fourth days. It lasted one day in three cases, all of which had emboli, and two days in the other case in which no diagnosis was made.

Pleuritic pain occurred in two cases, one primipara and one multipara. It was present on the first day in one case and on the second day in the other. It lasted two days in the former and three days in the latter. The first patient had a bronchitis and in the second no pathology could be demonstrated clinically.

3. ABDOMEN

Constipation. Only ten patients had this complaint, although the number of patients not having a daily evacuation was much larger. Three patients complained of constipation on the first day, one on the second day and six on the fourth. The duration was one day in six cases, 3, 4, 5 and 6 days in one case each. In all cases except two the constipation was enforced because of sutures. In the two exceptions examination after cathartics failed to work revealed fecal impaction.

Gas pains. Five primiparae and seven multiparae had this complaint. Three each occurred on the first, second and third days, two on the fourth and one on the seventh days. The pain lasted one day in six cases, two days in three cases, three days in two case and four days in one case. The cause was constipation in five cases, the effects of ether in three cases and no diagnosis was made in four.

Pain in the side. Eight patients, two primiparae and six multiparae, had this complaint. The location of the pain was on the right side in all cases. The day of onset was: two on the first day, one each on the second and third days, two on the fifth day and one each on the sixth and seventh days. The duration was one day in five cases, two days in two cases and five days in one case. The latter was a cystitis. Four patients had a uterus sensitive to touch. In two cases no diagnosis was made while in one case the diagnosis was after-pains.

Nausea. Three primiparae and one multipara complained of nausea. It occurred on the first day in two cases, and the fifth and eighth days in the other two. It lasted one day in three cases and three days in one case. Ether was responsible in two cases, a temperature in another case while no diagnosis was made in the fourth case. The latter was probably of psychic origin as it occurred on seeing the condition of the patient in the adjoining bed.

Heartburn. In spite of the large number of women who complained of heartburn during pregnancy this symptom was present in only three cases postpartum. Two had it the first day and one the second day. It lasted one, three and six days in one case each. Only one of the

cases had this symptom previous to delivery while in the other two it developed for the first time *during the puerperium.*

Pain in the epigastrium. This symptom occurred in three cases, two primiparae and one multipara. It was present on the fifth day in two cases and on the eighth day in the other case. In one patient it was due to gas, in another to a retroverted uterus, while no diagnosis was made in the third.

Diarrhea occurred in two cases, both multiparae, one on the third and the other on the sixth day. It lasted two days in both cases. One stated that she had this symptom with her last baby and in the other the cause was due to an error in diet.

Belching and pain after eating occurred in two *cases. In one the disturbance was probably* caused by ether and lasted one day. In the other the pain occurred on the third day and lasted one day. No diagnosis was made.

4. EXTREMITIES

Pain in the legs. Twenty patients, five primiparae and fifteen multiparae complained of pain in the legs. The day of onset and duration in days were as follows:

Day of Onset.....	1	2	3	4	5	6	7	8	9	10			
Number 10	2	1	1	0	1	1	0	2	2				
Duration in days....	1	2	3	4	5	6	7	8	9	10	16	20	30
and Number 13	2	0	2	0	0	0	0	0	0	1	1	1	

The diagnosis and frequency were: thrombophlebitis four; painful varicositic four; muscle soreness from posture during delivery six; pyelitis three; cramps one, while in two cases no diagnosis was made. The cases in which the duration of the pain was 16, 20 and 30 days were due to thrombophlebitis.

Pain from hypodermic injections was present *in four cases. It was located in the arms and* legs in two cases each. In three patients the *pain was present on the first day and in one* patient on the third day. The latter developed an infection. The pain lasted one day in two cases and three days in the other two.

Pain in the shoulder was present in three cases, one primipara and two multiparae. It occurred the first day in two cases and the third day in one case. It lasted one day in one patient and three days in the other two. Two patients had pain from muscular exertion and the third was suffering an accidental ether burn.

Pain in the hip occurred in two primiparae and in one multipara. It was present on the first, second and third days in one case each and lasted one day in one case and two days in two cases. In two cases a positive diagnosis was not established but was probably due to posture during delivery. The other patient stated that she had the pain during the last months of pregnancy.

Soreness in the biceps occurred in only one patient and was present the first three days postpartum. One patient complained that she had *muscular twichings in the legs.* It occurred on the fourth day and lasted two days. Another patient had a *boil on the arm* the first day postpartum; the pain lasted two days.

5. SKIN

Itching occurred in five cases, one primipara and four multiparae. It was present on the arm in one case, the feet in another, both arms and both legs in two cases and in the fifth it was on the vulva and due to a discharge. The onset was on the first, second, fifth, sixth and tenth days in *one case each. It lasted one day in four cases* and two days in the fifth. All cases with the *exception of the one on the vulva occurred in* the summer time and were due to heat rashes.

Excessive perspiration was present in two primiparae and in two multiparae. It occurred on the first and third days in two cases each. In three cases it lasted one day and in one case three days. It was physiological in all cases.

Herpes occurred in two primiparae and in two multiparae. The day of onset was one each on the second, fourth, sixth and seventh days. It caused no discomfort after the first day in three cases and after the second in another case. Two of the patients had an upper respiratory infection; *in the others a pyelitis was found in one* case and a retention of urine in the other.

6. GENERAL

Backache occurred in 27 patients, namely, 11 primiparae and 16 multiparae. The diagnosis and number were: muscular soreness seven, pyelitis five, after-pains five, salpingitis four, upper respiratory infection one, embolus one and no diagnosis was made in four. The day of onset and duration were as follows:

Day of onset....	1	2	3	4	5	6	7	8	9	10	13
Number 11	3	1	3	1	0	3	1	3	1		
Duration in days	1	2	3	4	5	6	7	8	9	10	13
and Number 11	5	4	3	2	0	1	0	0	0	1	

The patient in whom the backache was present for thirteen days had a pyelitis.

Numbness occurred in eight cases, three primiparae and five multiparae. It was present on

the first day in five cases, on the second day in two cases and on the eighth day in one case. The duration was one day in five cases, two days in another case and five and six days in one case each. The location and number were: in the finger tips in two cases and in the leg and thigh, forearm, feet, breasts and calves, one case each.

Dizziness was present in six patients, one primipara and five multiparae. It occurred on the first day in two cases, the fourth day in two cases and on the seventh and eighth days in one case each. It lasted one day in five cases and two days in one case. The diagnosis and frequency were: constipation two, toxemia one, eclampsia one, quinine one and no diagnosis one.

Stiffness occurred in five patients, three primiparae and two multiparae. It was present on the first day in three cases and on the second and fourth days in one case each. It lasted one day in four cases and three days in one case. The location and number were: legs three, right hip one and general one.

Insomnia occurred in five patients, all primiparae. It was present on the first and second days in two cases each and on the sixth day in one case. It lasted one day in four cases and two days in one case. In one patient the cause was a pain in the leg. Another stated that she had a stiffness in the right hip while in the other three no cause could be found.

SUMMARY AND CONCLUSIONS

From the foregoing enumeration and discussion of complaints, it is evident that those due to labor are very frequent and numbered 953 while those not due to labor numbered 232. After-pains, complications in the breast and discomfort due to sutures were the most frequent. Moreover 50% of the primiparae with after-pains had a profuse lochia evidently due to a decrease in contractility of the uterine muscle as ecbolic medication invariably controlled the excessive lochia. A drachm of ergot or an ampule of pituitrin may sometimes give relief from after-pains. According to De Lee over one-half the nursing mothers have sore nipples during the first few weeks postpartum. In this series the number was 8.7%. The frequqency of sore nipples in blonds and red-haired women was not greater than in brunnettes. though it is usually stated that the former suffer more frequently. Strenuous efforts on the part of the infant to obtain nourishment in a poorly secreting breast was the probable etiology of almost all sore nipples. Of several methods of treatment tried it was found that taking the infant off the breast for 12 to 24 hours was the best. The pain was no longer present even though a scab was still there. If necessary the breast may be pumped in the meantime. Discomfort due to sutures was easily alleviated by covering with adhesive the knot into which the sutures were tied. This is done always immediately after repair but the adhesive is often loosened by the lochia and the postpartum perineal irrigations. Hemorrhoids may become very annoying and cause the puerpera a good deal of distress. We have found that replacement and an ephedrine ointment gave the quickest relief. Retention and ischuria paradoxa were treated by catheterization at twelve hour intervals. Patients with residual urine were catheterized after every urination until the amount obtained was 30 cc. or less.

DISCUSSION

Dr. Otto H. Crist, Danville: Dr. Simunich's paper shows a world of work and a world of detailed statistical information. Much of the content is of such minor significance and so little importance that it hardly seems worth the effort. Many of the complaints are from conditions which are considered normal. I wish to commend the Doctor, however, on his willingness to devote so much time and energy on these minor details. Since this paper gives nothing on etiology or treatment it leaves little room for discussion. I will comment on a few of the Doctor's findings.

First, in the matter of bleeding. One cannot help but be struck by the small number of cases of hemorrhage—four, and none of these severe enough to require radical treatment. This is commendable and speaks for good conduct of labor, especially the third stage.

Second, painful sutures. There is a bunch of fine gentlemen in the north end of the state who seem to think they must use non-absorbable sutures in all perineal repairs. Now the sooner they learn that non-absorbable sutures are not necessary in normal clean cases the sooner they will have painless sutures. I am not speaking of the infected or potentially infected, or the badly macerated case, but the normal clean episiotomy will heal just as readily and far less painfully and with less scar when closed with subcutaneous plain catgut. This statement has been proved over years of time and with hundreds of cases. I again wish to compliment the Doctor on his episiotomies, 327 on 390 primiparas.

Third, painful nipples. The Doctor's cases must have had good prenatal care, for in my opinion this is the time to treat painful nipples. Nipples should be prepared for nursing weeks before labor by thorough removal of the scaly skin condition with either a brush or rough cloth and soap and water. Repeat this daily or every few days and follow with the application of

any oil until it can be done painlessly. If this procedure is continued until labor there should be but few painful or cracked nipples. The cracked nipple is one of the most annoying complications of the puerperium. In my experience its treatment is unsatisfactory. My success in the treatment of large, deep, circular cracks has not been equal to that outlined in Dr. Simunich's paper. I believe that this condition in the severe cases is sufficient reason for discontinuing nursing the breast and putting the babe on artificial feeding if the other breast is not sufficient. As time goes by, and more and more women are not able to nurse their babies, we are taking the baby away from the breast more readily than in former years. There is such a likelihood of forming an abscess from this condition that we are afraid to carry it for any length of time. This leads us to abscess of the breast.

Abscess of the breast is a formidable condition. The Doctor is to be complimented on having had only two. I think infected breasts are often neglected. I have seen a whole breast destroyed by waiting for definite fluctuation. A breast should be put to rest on suspicion of infection. It should be opened at the first sign of localization. These signs are localized pain and tenderness, slight redness and edema. When opened early the breast is saved.

One more point and I shall have finished. Phlebitis—again prophylaxis is a great factor in thrombophlebitis. Given a woman with large varicosities of the legs and vulva, and we suspect involvement of the broad ligaments. That woman should have repeated daily exercises of the body and limbs. Such exercises keep the blood moving and the veins more or less empty. This fact was brought out by Polak years ago and is now common practice. One question I would like to raise and that is when to start exercises in a case of phlebitis.

The Doctor is to be congratulated again on having only four cases of phlebitis. It is interesting and gratifying to note that no mention was made of complaints associated with infections of the pelvis.

There are many things in this tabulation that bespeaks good obstetrics, the most outstanding of which is the few major troubles.

Dr. George de Tarnowsky, Chicago: Dr. Simunich is to be congratulated on the immense amount of work he has done to review 1,000 cases and tabulate all the minor incidences and discomforts. It meant an enormous amount of work. I hope he will continue his interest and give us some more data on prophylaxis.

In regard to Dr. Crist's statement, I want to assure him that in the little village north of Springfield the number of surgeons who are using non-absorbable sutures is decreasing. At the Ravenswood Hospital where I work only two or three of the occasional obstetricians are using silkworm-gut. We are using catgut.

The paper is important but I do not think it is finished. When we can have some prophylaxis and the etiology intensified I think the paper will be of help.

Dr. V. D. Lespinasse, Chicago: In the Doctor's tabulation there seems to be a minimum number of complaints in regard to the urinary tract. When a woman is pregnant the kidneys and urinary tract are subject to extra strain and they should be looked after both before and after labor. One of the interesting cases in my experience was a woman who developed pain in her side about the fourth month of pregnancy, and pus in the urine. When we came to work up the case we found that the pain in the side was due to a definite kink in the ureter. The pain was mechanical. The pus in the urine came from the other kidney and was symptomless, which was rather an unusual finding.

The determination of bladder complaints and the examination of the bladder in pregnant women is a quite different technical procedure than in the non-pregnant woman. The shape of the bladder changes in pregnancy somewhat as mentioned in Dr. Reis' paper about fibroids. The bladder is low down in the early days of pregnancy and as the pregnancy progesses the fibroid goes up, and the same thing happens to the bladder as it goes up. The bladder is well off from the uterus but in pregnancy it spreads up into an elliptical shape and into a curve. Those of you who do cystography for the diagnosis of placenta previa probably appreciate that. The ureters are pushed to the side and then the orifices are farther away from the median line and they are farther up. When we try to look for the ureters in their usual location we will find they are not there. They are higher up and farther towards the lateral wall. The further advanced the pregnancy is, the more difficult it becomes from a technical standpoint to catheterize the ureters and cystoscope the bladder because the bladder is no longer elliptical, but crescent shaped.

Dr. Herbert E. Schmitz, Chicago: I think this is an opportune time to call your attention to what the radiologists are doing with infections. They have shown that x-ray is valuable in furunculosis, surgical parotitis, carbuncles, erysipelas and postoperative infections. I see no reason why it should not be used in breast abscess. In furunculosis it usually breaks down the infection very rapidly, relieves pain and often aborts the entire condition. I think we should use it in breast abscess.

Dr. William Simunich, Chicago (closing): I wish to thank Dr. Crist for discussing the paper. About the sutures, this was done quite some time ago. Most of these episiotomies were done by interns. We try to have them use a uniform technic and that is the reason we used interrupted silkworm-gut sutures.

Dr. deTarnowsky asked about etiology. I would just like to show one slide to illustrate the etiology of cracked nipples. I made the statement that most of them were due to the fact that the women did not have enough milk in the breasts. In the great majority of those patients complaining of painful nipples the date of onset was before the women had enough milk in the breasts, and therefore the statement that almost all cracked nipples are due to the fact that the baby does not get enough to eat. That is just one thing I would like to contribute to the etiology.

About bladder symptoms, there were only 39 patients who complained of retention of urine. We did not have much difficulty with urinary complaints.

Society Proceedings

CHICAGO MEDICAL SOCIETY

Wednesday, November 2, 1938

Program—"Surgery of High Blood Pressure."

"The Physiological Aspects of the Surgery of High Blood Pressure"—A. C. Ivy, Professor of Physiology, Northwestern University Medical School.

"The Surgical Treatment of High Blood Pressure—Its Value and Limitations"—Max M. Peet, University of Michigan, Ann Arbor, Michigan.

Discussion—Geza de Takats, Loyal Davis, Wilber E. Post, Robert W. Keeton, A. J. Carlson, James H. Hutton, R. W. McNealy, Adrian Verbrugghen, Julius M. Rogoff (by invitation).

Wednesday, November 16, 1938

Program—Symposium on Industrial Dermatoses.

The Objectives of the New American Medical Association Council on Industrial Health as Pertaining to Industrial Skin Diseases—Earl D. Osborne, Buffalo, N. Y.

A Consideration of Occupational Dermatoses Under the Illinois Workmen's Occupational Diseases Act of 1936—Harry R. Foerster, Milwaukee, Wis.

(a) Incidence and Treatment of Industrial Dermatoses (inclusive of prophylaxis).

(b) Technique and Interpretation of Patch-testing—Clark W. Finnerud.

Discussion—Wm. Allen Pusey, James H. Mitchell, Erwin P. Zeisler, Edward A. Oliver, Frances E. Senear, Carl M. Peterson.

Marriages

PAUL L. BERGSTROM, Kirkland, Ill., to Miss Lyne Gruhn of Columbus, Wis., September 4.

PAUL HARDIN HARMON to Miss Mary Logan Coleman, both of Springfield, Ill., September 13.

EDWARD A. KUEHN, Vandalia, Ill., to Miss Marguerite Robbie of Cedar Rapids, Iowa, August 8.

ALFRED M. PAISLEY, Jacksonville, Ill., to Miss Elizabeth Winger of Keokuk, Iowa, September 3.

Personals

Dr. Archibald L. Hoyne addressed the West Side Branch of the Chicago Medical Society November 17 on "Management of Scarlet Fever."

At a meeting of the Tri-County Medical Society in Galesburg, October 25, Dr. Warren H. Cole, Chicago, spoke on hyperthyroidism.

The Stephenson County Medical Society was addressed October 27 by Drs. Joseph K. Calvin and Abraham F. Lash, Chicago, on nephritis and puerperal sepsis, respectively.

A new district health department has been established in Woodstock to serve the counties of Boone, Lake, McHenry and Winnebago. Dr. John F. Shronts is the district health officer.

Dr. Paul H. Harmon, Chicago, addressed the Woodford County Medical Society, September 19, on "Diagnosis and Treatment of Suppurative Arthritis of the Hip with Special Reference to Pathologic Dislocation."

The Chicago Tuberculosis Society was addressed October 20 by Drs. Paul H. Holinger on "Bronchial Obstruction Produced by Cardiovascular Disease" and Willard Van Hazel, "Problems in Chest Surgery."

The Sangamon County Medical Society was addressed in Springfield, October 6, among others, by Drs. Emmet F. Pearson and Darrell H. Trumpe on "Anatomy and Physiology of Chronic Bronchitis and Bronchial Asthma" and "Diagnosis and Management of Minimal Pulmonary Tuberculosis" respectively.

Dr. Maurice Gore, Aurora, has been appointed medical officer in charge of the new health district embracing the counties of DeKalb, Grundy, Kane, Kendall and LaSalle. A new unit including Bond, Clinton, Madison and St. Clair counties has been placed under the direction of Dr. Claude Milton Eberhart, Highland.

Dr. E. L. Cornell addressed the Stephenson County Medical Society, November 3 on "Repair of Obstetric Injuries."

Dr. B. C. Corbus, Nathan S. Davis III and A. A. Goldsmith presented papers at the Southern Illinois Medical Association, East St. Louis, November 3.

Dr. J. P. Greenhill addressed Will-Grundy County Medical Society, November 2, on "Diagnosis and Treatment of Obstetric Hemorrhages."

Dr. Samuel J. Fogelson addressed the Fulton County Medical Society, November 1, on "Treatment of Gastro-Duodenal Ulceration."

Dr. Herbert Rattner addressed a meeting at the St. Catherine Hospital, Indiana Harbor, Indiana, October 25, on "A Practical Consideration of the Commoner Skin Diseases."

Dr. Philip H. Smith gave a talk on "Management of Placenta Previa" before the McHenry County Medical Society, October 27.

Drs. Benjamin M. Levin and Henry Buxbaum presented the scientific program at the November 11 meeting of the Jersey and Greene County medical Societies. Their subjects were "Infant Feeding" and Prolonged Labor."

Dr. Harry M. Hedge gave an address on "Treatment of Syphilis" before the Kankakee County Medical Society, November 10.

Dr. Leon Unger addressed the Medical Society of Jamestown, New York, October 27, on the subject of "Allergy in General Practice."

Dr. Irving F. Stein gave a talk on "Forceps Delivery" before the Lake County Medical Society, November 7, and before the Stephenson County Medical Society, Nov. 10.

Dr. William R. Cubbins gave an address on "Management of Fractures of Long Bones" before the Bureau County Medical Society, November 8.

Dr. Frederick B. Balmer addressed the Law Forum of Northwestern University Law School, November 17. His subject was "The Doctor on the Witness Stand."

Dr. William S. Sadler discussed "Psychiatric Aspects of Medical Practice" before the Postgraduate Conference of the Wayne County Medical Society at Detroit, November 9. In the evening he gave an address at Grand Rapids to the Michigan Public Health Association on "Mental Hygiene."

Dr. S. M. Feinberg was guest speaker at the November 17 meeting of the Oklahoma Allergists held in connection with the Southern Medical Association. His subject was "Clinical Aspects of Mold Allergy."

Dr. Louis W. Sauer addressed the Lake County Medical Society at St. Therese's Hospital, Waukegan, November 14. He gave a talk on "Care of the New Born" before the Stephenson County Medical Society on November 17.

Dr. Rollin Turner Woodyatt gave a paper on "Diabetes" before the DeWitt County Medical Society, November 14, at Clinton, Illinois.

Dr. E. L. Compere addressed the Will-Grundy County Medical Society at Joliet, November 16.

Dr. Fred M. Drennan addressed the Coles-Cumberland County Medical Society at Mattoon, November 16, subject, "Diseases of the Stomach."

Dr. A. F. Lash talked on "Recent Advances in the Management of Puerperal Sepsis" and Dr. M. P. Borovsky on "Infant Feeding" before the Knox-Warren County Medical Societies, November 17.

Dr. Julius L. Spivack addressed the Springfield Academy of Medicine, Springfield, Massachusetts, November 8. His subjects were "Tubovalvular Gastrostomy" and "The Surgical Management of Peptic Gastric and Duodenal Ulcer."

Dr. Seymour Fisher, formerly on the staff of St. Vincent's, Cook County, and Mt. Sinai of Chicago, has accepted the position of pediatrician at the Illinois Soldiers and Sailors Children's School at Normal, Ill.

News Notes

—Have you seen the exhibit in the Marshall Field & Co. Annex prepared by the Educational Committee for the Chicago Medical Society? The material was furnished through the courtesy of the University of Illinois College of Medicine, Mr. Tom Jones Department, and Doctor Paul H. Holinger.

—Dr. Paul C. Barton, since 1934 a member of the staff of the Council on Pharmacy and Chemistry, has been appointed director of the Bureau of Investigation of the American Medical Association. Following graduation from the University of Maryland School of Medicine, Baltimore, and completion of his internship, Dr. Barton spent several years in private practice.

—According to the *Health Messenger,* a young woman in the village of Westville died September 17 from what the attending physician described as a typical attack of rabies. About four months previously the woman was scratched on the leg by a puppy that is believed to have been rabid at the time. Since the death of the woman, seven relatives who believed they had been exposed to rabies by the patient or the dog have taken the Pasteur treatment.

—The third annual meeting of the Physicians' Association, state department of public welfare, was held in the rooms of the Kankakee County Medical Society, Kankakee, October 12. Dr. Abraham A. Low, assistant state alienist, discussed the newly organized association of former patients of the Psychiatric Institute of the Research and Educational Hospitals, University of Illinois, Chicago, and its implications for the entire group of mental patients, and Dr. Louis Belinson, Elgin, a comparative survey of antisyphilitic treatment in the state hospitals.

—Dr. Ludvig Hektoen executive director of the National Advisory Cancer Council, Washington, D. C., and director of the John McCormick Institute for Infectious Diseases, Chicago, delivered the fifteenth Pasteur Lecture at a public meeting in the auditorium of the Museum of Science and Industry, Jackson Park, November 22, under the auspices of the Institute of Medicine of Chicago and the Cancer Research Institute of the Chicago Woman's Club. The subject was "Progress in the Knowledge and Control of Cancer." The first Pasteur Lecture was given in 1920 and subsequently each year until 1931. Resumed in 1935, the lectures have been given annually since then. They are designed for laymen.

Deaths

EDWARD EVERETT BARBOUR, Peoria, Ill.; Physio-Medical College of Indiana, Indianapolis, 1899; member of the Illinois State Medical Society; aged 69; died, September 22, of lobar pneumonia and Parkinson's disease.

HARRY PARKE BEATTY, Chicago; University of Wisconsin Medical School, Madison, 1930; aged 33; died, September 4, of injuries received in an automobile accident.

WILLIAM EMMETT BUEHLER, Chicago; College of Medicine and Surgery, Chicago, 1904; Hering Medical College, Chicago, 1906; a Fellow, A. M. A.; president emeritus and on the consulting staff of the Illinois Masonic Hospital; diagnostician on the staff of the American Hospital; aged 69; died, September 19, of coronary disease.

WILLIAM J. C. CASELY, Marengo, Ill.; Chicago Medical College, 1885; aged 76; died, August 2, of atrophic cirrhosis of the liver.

TRUE DELOSS COE, Keithsburg, Ill.; Rush Medical College, Chicago, 1884; a Fellow, A. M. A.; past president of the Mercer County Medical Society; aged 78; died, September 7, in a hospital at Monmouth of pneumonia.

ALFRED CARENO CROFTAN, Chicago; Hahnemann Medical College and Hospital, Chicago, 1896; a Fellow, A. M. A.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1898; at one time on the staff of St. Mary of Nazareth Hospital; aged 67; died, August 22, in Pasadena, Calif., of carcinoma of the colon.

CLARENCE A. EARLE, Des Plaines, Ill.; College of Physicians and Surgeons of Chicago, 1887; a Fellow, A. M. A.; member of the American Academy of Pediatrics; for many years attending physician to St. Mary's Training School; on the staff of the Northwestern Hospital; aged 76; died, October 28, in St. Luke's Hospital, Chicago, of coronary thrombosis.

OLIVER PERRY ERWIN, Medora, Ill.; Missouri Medical College, St. Louis, 1887; at one time mayor; aged 75; died, September 5, of cystitis.

WILLIAM J. HARRELL, Elkville, Ill.; Memphis (Tenn.) Hospital Medical College, 1883; past president of the high school board of education; aged 78; died, August 21, of cerebral hemorrhage.

EDWARD MARQUETTE HARRINGTON, Chicago; Northwestern University Medical School, Chicago, 1924; member of the Illinois State Medical Society; aged 40; died, August 22, in Peoria, of coronary occlusion.

GEORGE ARCHIBALD HUTCHINSON, Capron, Ill.; Northwestern University Medical School, Chicago, 1909; aged 53; died, August 4, of injuries received in a fall.

ROBERT H. JACOBS, Joppa, Ill.; Kentucky School of Medicine, 1894; served during the World War; died, September 9, of paralysis agitans.

FINLEY P. JOHNSON, Hoopeston, Ill.; Rush Medical College, Chicago, 1885; aged 82; died, August 8, in the Lake View Hospital, Danville, of bronchopneumonia.

VICTOR JOSEPHSON, Chicago; College of Physicians and Surgeons of Chicago, 1894; a Fellow, A. M. A.; aged 70; died, September 11, of coronary thrombosis and arteriosclerotic heart disease.

THOMAS BASSETT KEYES, Lake Bluff, Ill.; Albany (N. Y.) Medical College, 1895; a Fellow, A. M. A.; aged 62; died, October 2, of myocarditis.

MORRIS LEON LOEVENSON, Chicago; College of Physicians and Surgeons, Baltimore, 1893; aged 76; died, September 27, of carcinoma of the stomach.

FRANCIS W. MCNAMARA, Chicago; Chicago Medical College, 1889; for many years county jail physician; aged 71; died, September 16, in the Presbyterian Hospital of cerebral hemorrhage.

GOLDER LEWIS MCWHORTER, Chicago; Rush Medical College, Chicago, 1913; a Fellow, A. M. A.; associate clinical professor of surgery at his alma mater; member of the Western Surgical Association; fellow of the American College of Surgeons; served during the World War; on the staffs of the Presbyterian Hospital, Oak Forest Infirmary and Cook County Hospital; author of numerous surgical papers, especially on the gallbladder and gastrointestinal tract; aged 50; died, October 16, of retroperitoneal sarcoma and uremia.

WILLIAM E. PITTMAN, Roseville, Ill.; Rush Medical College, Chicago, 1885; member of the Illinois State Medical Society; aged 79; died, August 8.

JAMES EUGENE PRITCHARD, Aurora, Ill.; Washington University School of Medicine, St. Louis, 1908; member of the Illinois State Medical Society; aged 52; died, August 6, of amyotrophic lateral sclerosis.

DAVID NICHOLAS SCHAFFER, Evanston, Ill.; Loyola University School of Medicine, Chicago, 1916; aged 52; died, August 24, in the Westlake Hospital, Melrose Park, of adenocarcinoma of the rectum.

CARL SCHURTZ, Streator, Ill.; Marion-Sims College of Medicine, St. Louis, 1900; member of the Illinois State Medical Society; aged 62; died, August 13, in St. Mary's Hospital following a gallbladder operation.

ALBERT MORTON SHAW, Nauvoo, Ill.; Medical College of Ohio, Cincinnati, 1890; a Fellow, A. M. A.; formerly secretary of the Hancock County Medical Society; aged 73; died, September 13, in Burlington, Iowa, of pyelonephritis.

JOSEPH SHINGLMAN, Cicero, Ill.; Illinois Medical College, Chicago, 1909; a Fellow, A. M. A.; formerly city health officer; aged 58; died, August 7, of angina pectoris.

CHARLES DELBERT SNIVELY, Ipava, Ill.; College of Physicians and Surgeons, Keokuk, Iowa, 1897; served during the World War; member of the Illinois State Medical Society; secretary of the Fulton County Medical Society; aged 63; died, August 2, of heart disease.

THOMAS M. STAPLETON, Chicago Heights, Ill.; Chicago College of Medicine and Surgery, 1914; a Fellow, A. M. A.; aged 53; died, August 9.

ALBERT T. WASHBURN, Taylorville, Ill.; Chicago Homeopathic Medical College, 1891; aged 67; died, August 5, in Edinburgh of heart disease.

ADOLPHUS GEORGE WIPPERN, Chicago; Missouri Medical College, St. Louis, 1890; College of Physicians and Surgeons, Medical Department of Columbia College, New York, 1892; member of the Illinois State Medical Society; formerly on the staff of St. Elizabeth's Hospital; aged 70; died, August 15, of arteriosclerosis, nephritis and diabetes mellitus.